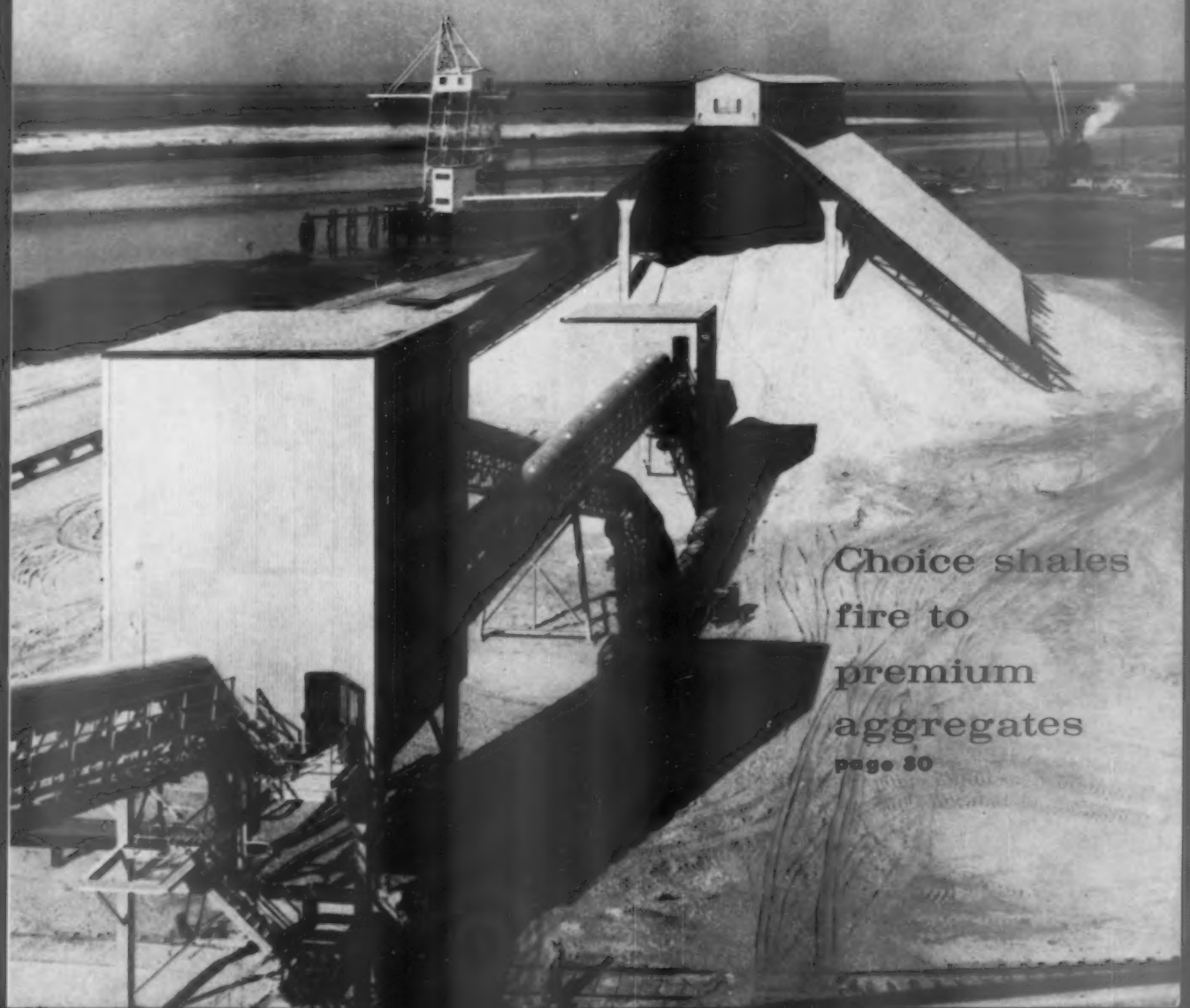
NOVEMBER 1960

ROCK PRODUCTS

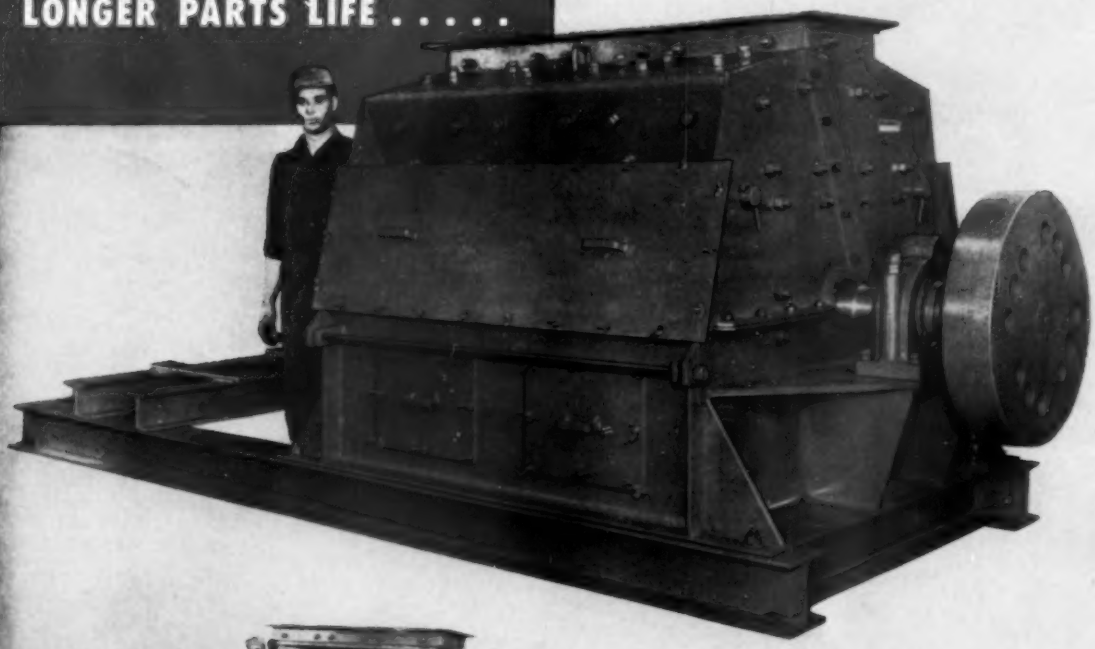
Bestwall surges into deep South page 66

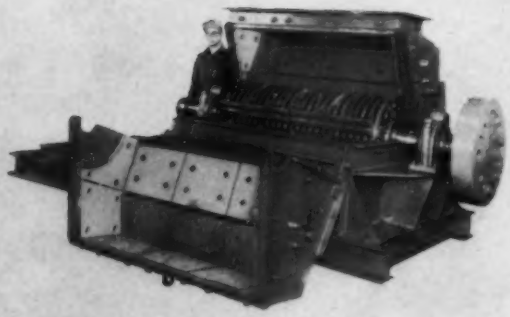


Choice shales fire to premium aggregates page 80

NEW DUAL "2-POINT" ADJUSTMENT INSURES MORE UNIFORM GRINDING, LONGER PARTS LIFE . . . . .

WILLIAMS *Reversible* HAMMER MILLS





Williams Reversible Hammer Mill with cover open.
Note these features:

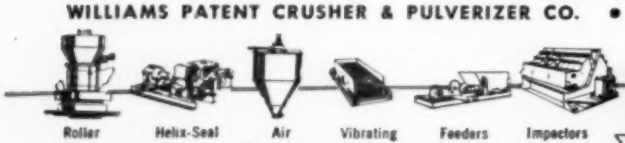
- Super-strong reinforced steel plate frame
- Renewable wear-resistant manganese steel liners
- Heavy duty oversize forged steel rotor shaft
- Anti-friction self-aligning roller bearings in dust-tight housings
- Complete accessibility to interior for quick parts changing

It's another Williams "first"—features not available in other hammer mills—that now makes it possible to maintain the original close clearances of *both* grinding plates *AND* cage sections against the rotating hammers. This easy-to-make "2-point" adjustment, in the most critical grinding area inside the hammer mill, gives absolute assurance of consistently uniform product quality.

In addition to the advantages of the Dual "2-Point" Adjustment, a Williams Reversible Hammer Mill substantially lowers upkeep expense by cutting hammer cost. Hammers can be operated in one direction today and another tomorrow simply by installing a simple reversing switch on the driving motor. Manual reversing of hammers no longer necessary. Grate bars also last longer. The double set of reversible manganese breaker plates, which last twice as long as other types, give four times the service! Maintenance and downtime are cut 50% or more.

Get all the facts about the hammer mill with *ALL* the top features.

WILLIAMS PATENT CRUSHER & PULVERIZER CO. • 800 ST. LOUIS AVE. • ST. LOUIS 6, MO.



Roller Mills | Helix-Seal Mills | Air Separators | Vibrating Screens | Feeders | Impactors

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

Oldest and Largest Manufacturers of Hammer Mills in the World

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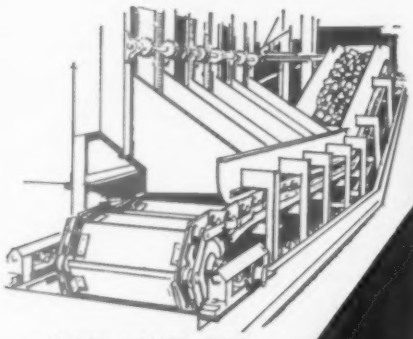
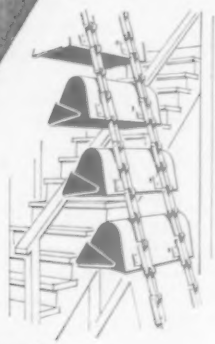
LINK-BELT long-pitch SS class bushed chain . . .

BUILT FOR THE LONG, HARD GRIND



FLANGED ROLLER TYPE for applications where the chain will operate on various type rails.



PLAIN ROLLER TYPE for applications where the chain will operate in channels, angle guides or vertically.

WHERE the going is tough—especially where abrasion and round-the-clock operation are encountered on long, slow-speed conveyors and elevators—long-pitch SS class chain pays off in low initial cost and maintenance, fewer shutdowns. These heavy-duty chains conform to all commercial standards for clearance and fits; pins and bushings have flats and notches to lock them against rotation in the sidebars.

Industry's most modern chain-producing facilities enable Link-Belt to design and build special-type chains and sprockets to suit specific applications. Get full facts from Catalog 1050. Write direct, or call your Link-Belt office or authorized stock-carrying distributor . . . in the yellow pages of your phone book, under CHAINS.

LINK-BELT

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November 1960

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Rubber takes pounding that wears holes in steel

YOU quarry men can sympathize with this impact problem at a Michigan iron ore mine. Big chunks of ore—some weighing up to 2 tons—crash down from that vibrating feeder to a wear pad below. This terrific pounding 8 hours a day, 5 days a week, quickly wore holes in a ½" thick steel plate, caused frequent shutdowns for repairs and replacement.

To avoid these costly delays, a B.F.Goodrich distributor suggested a wear pad made of a rubber called Armorite, specially compounded to stand this sort of a beating. This rubber is soft enough to *give* under the pounding it gets, yet so tough that it is even used in some places to carry broken glass.

The Armorite wear pad stood up under the pounding for 14 months—six times longer than the steel plate. And the Armorite pictured at left, which replaced the first when it finally wore out, is expected to last even longer because of a different method of installation.

B.F.Goodrich Armorite can be used in dozens of ways—as a liner, curtain, throw mat for protection against abrasives. Can be ordered with or without a reinforcing back of fabric, fiber or steel. Your B.F.Goodrich distributor has full information on Armorite. And, as a factory-trained specialist in rubber parts, he can answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-883, Akron 18, Ohio.*

B.F.Goodrich

CHUTE LINING

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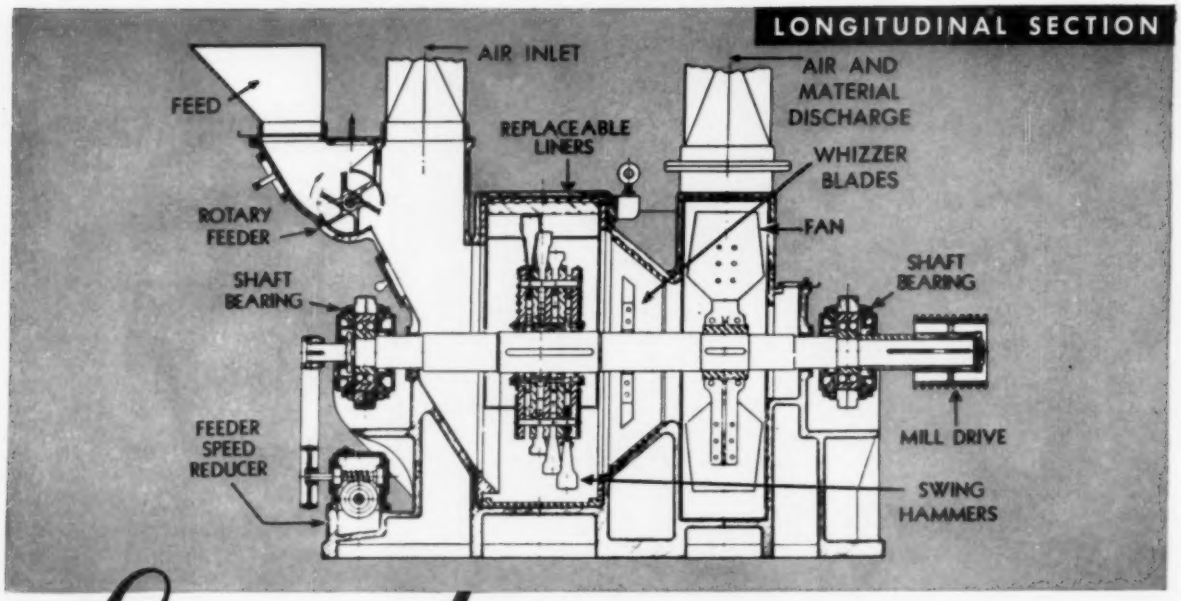


Raymond's RUGGED IMP MILL

THE MULTI-PURPOSE GRINDING UNIT

GRINDING • BLENDING • SEPARATING • CONVEYING • DRYING

✳ DESIGNED FOR FINE GRINDING

The Imp Mill is particularly intended for medium fine and fine grinding of softer non-metallic minerals and many manufactured products. Wide usage of the Imp Mill is made in a great many fields where pulverizing is desired.

✳ VERSATILITY OF APPLICATION

Mills are built in a variety of types and sizes to produce many different capacity requirements. They have a wide degree of adjustment of product fineness, ranging from about 20 mesh to 325 mesh, depending upon material handled.

✳ NEED OF CLASSIFIER

For higher finenesses or more uniform finished products than the Imp Mill would normally produce, an air classifier may be used. Either an integral Whizzer Separator or a Raymond Mechanical Air Separator could be installed according to the particular type of operation needed and the material to be processed.

✳ FLASH DRYING

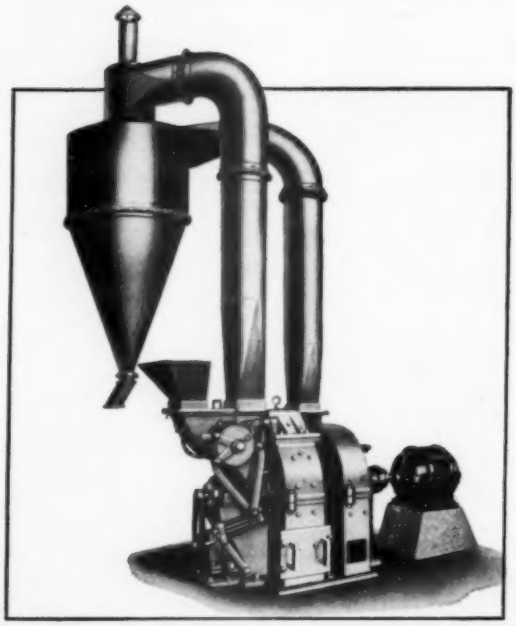
The basic design of the Imp Mill readily adapts itself to the simultaneous drying and pulverizing of materials. The Mill utilizes heated air or products of combustion for removing surface moisture and, in special cases, chemically combined water from materials during grinding. In all instances air is used as the conveying medium.

✳ FLEXIBLE IN INSTALLATION

Each Mill System is a compact installation, engineered to fit most any plan or layout. The floor space is held to minimum requirements of Mill and Drive Motor. Piping variations permit cyclone collector, within limits, to discharge material where needed. Systems are completely enclosed from feed hopper to finish bin.

✳ DUSTLESS OPERATION

The excess air is diverted to a secondary collector or, where permissible, can be exhausted to the atmosphere.



FOR FURTHER DETAILS ON THIS AUTOMATIC UNIT
WRITE FOR RAYMOND IMP MILL CATALOG NUMBER 87R

COMBUSTION ENGINEERING, INC.

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Raymond Division

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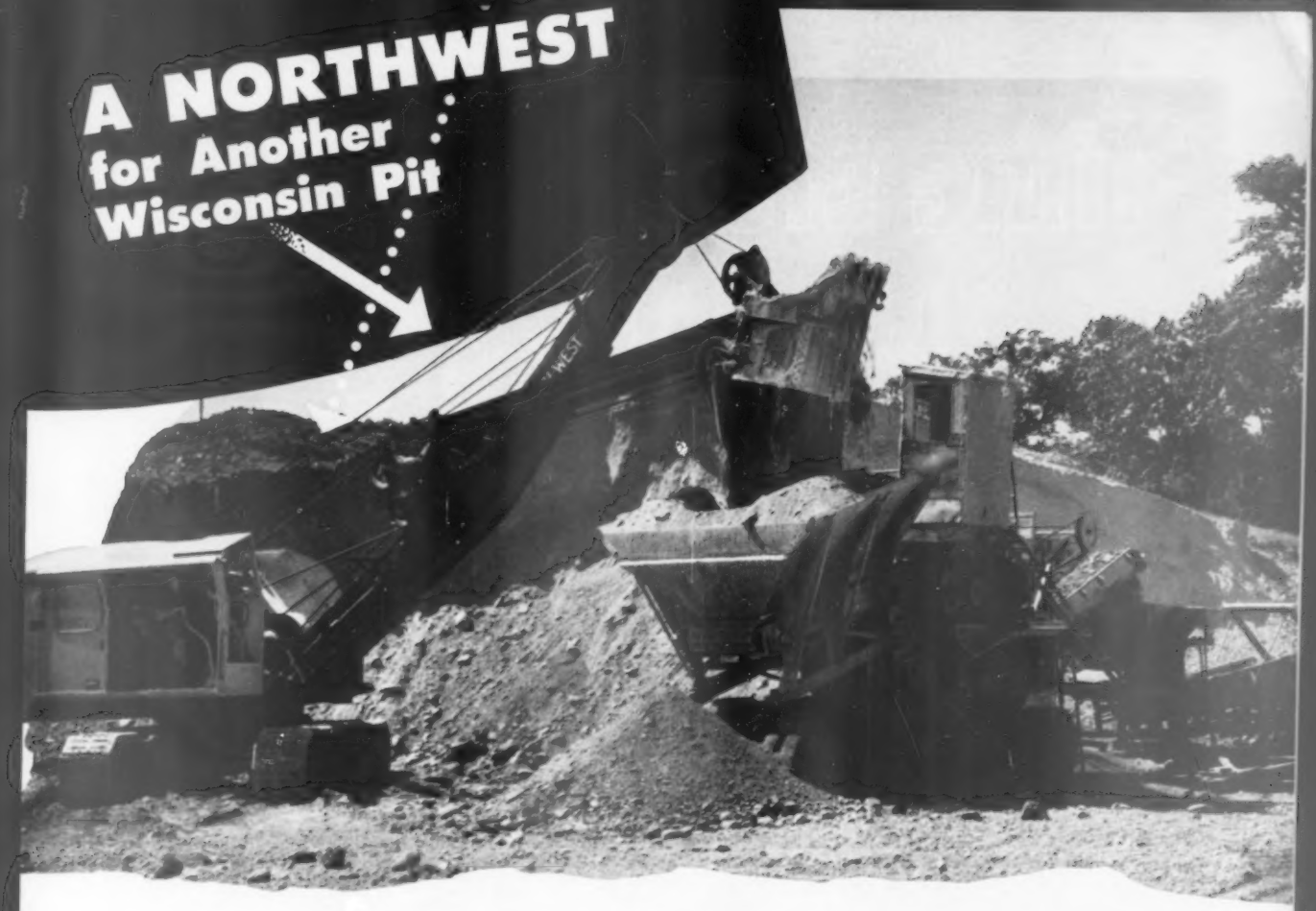

A MODEL 6 for C.C. LINCK, Beaver Dam, Wisconsin

Here is another one of the many aggregate producers in Wisconsin who depends on Northwest Shovel equipment to stay ahead of the crushers.

This is a Northwest Model 6, 1½ yd. Shovel and it is working in the pits of C.C. Linck of Beaver Dam, Wisconsin.

The Model 6 has been the choice of many pit operators for feeding portable plants.

Like all Northwests, the Model 6 is a *real* Rock Shovel—no stutter—no restarts—no dipper juggling.

The Northwest Dual Independent Crowd utilizes force most other independent crowd shovels waste. It's a clean cut through the bank without delays or restarts. Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and make spotting smooth and easy, reducing spillage. The Feather-Touch Clutch Control makes operation easy for greater output and gives the feel of the dipper when handling boulders or heavy rock digging. Northwest Steering reduces the delays of relocation. These are just a few of the advantages that have put so many Northwests in gravel pits all over the country. They help to assure maximum crusher production!

Why not find out why so many contractors and gravel producers in the country have bought Northwests again and again. Let us give you the full story.

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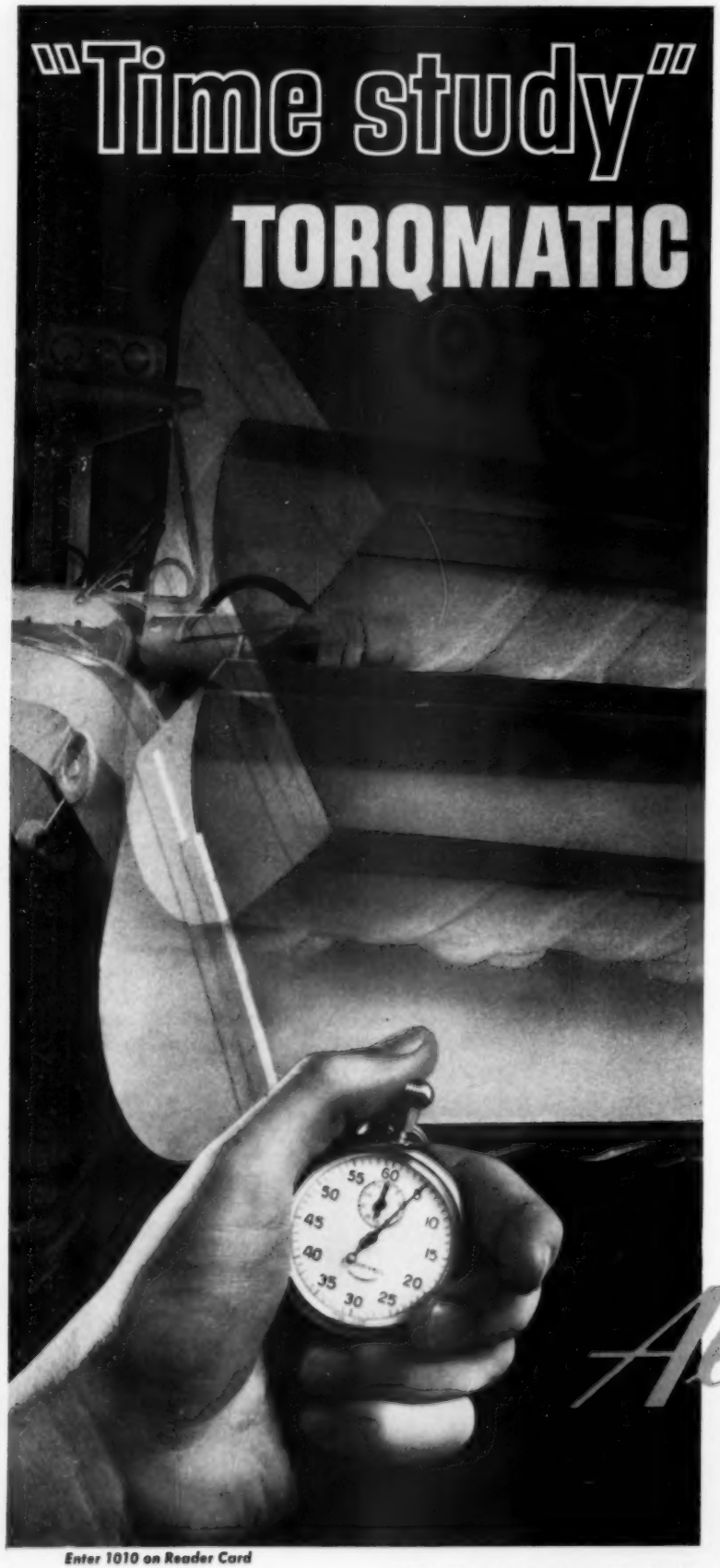
NORTHWEST

Always Ready to GO

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton to 35-Ton Capacity



3-SPEED

cuts loader shifting slow-downs

Cut loader shifting slow-downs and you're bound to speed loader job-cycles.

And no loader transmission cuts shifting slow-downs like "Time-Study" TORQMATIC. Reason? It needs only 3 speeds where other hydraulic transmissions need 4 . . . naturally, TORQMATIC-equipped loaders crowd, dig, load and travel faster.

That's just one reason why 9 out of 10 leading loader manufacturers use "Time-Study" TORQMATIC.

More? This single-unit converter-transmission team has fewer hoses to plug, leak or crack . . . has clutches up to twice the diameter of those used in other hydraulic transmissions *. . . is designed to need no major service for two engine overhauls.*

What's more, it's easier and cheaper to repair and maintain. Gears can be replaced in about 4 steps where other hydraulic transmissions need over 20.

It's easy to see why more and more loaders are carrying the TORQMATIC label – why more and more loader buyers are talking TORQMATIC. Want to know more? See your loader dealer or write Allison today.

Allison Division of General Motors
Indianapolis 6, Indiana
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Allison TORQMATIC

TORQMATIC® DRIVES

THE MODERN DRIVE FOR MODERN LOADERS

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450 FEET

OF TRAYLOR KILN EFFICIENCY

Shown above is one of two 12′ x 450′ Traylor rotary kilns designed and built to meet the requirements of the Standard Lime and Cement Company, Martinsburg, West Virginia. Both are wet process kilns driven by dual drives with forged steel riding rings and forged steel supports. These kilns feature the Traylor-designed chain systems and dust return scoops. They are fed by a Traylor slurry feeder.

Write today outlining your kiln requirements and let our engineers make recommendations . . . or write for Bulletin No. 1115.

TRAYLOR ENGINEERING & MANUFACTURING
DIVISION OF FULLER COMPANY
1557 MILL ST., ALLENTOWN, PA.

Sales Offices: New York — Chicago — San Francisco
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TKA-8

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LUBE LOGIC Tips for more

How to put engines in mothballs

As hard as you try to keep all your equipment at work all the time, invariably there'll be times when you just have to prepare a piece of motorized equipment for an idle stretch. Long idle periods can take a heavy toll on an unprotected engine. These eleven steps assure you that the engine will be in as good condition when you start it up again as it was when you put it away.

1 Run the engine for a while and drain the oil while it's hot. Install new filter element.

2 In mild climate, drain and flush cooling system and refill with rust-inhibited water solution. In sub-freezing climate, drain, flush and refill with rust- and corrosion-inhibited anti-freeze.

3 Refill crankcase with Texaco Ursa Oil Heavy Duty, idle the engine fast for about 20 minutes, and shut it down. For diesel engines, add 3% Ursa Oil Heavy Duty (of correct seasonal grade) to the fuel before this idling period, and afterward fill the tank with a good diesel fuel.

4 Remove spark plugs and squirt a little Ursa Oil Heavy Duty into spark-plug holes while engine is being turned over. Dip plug electrodes in Ursa and replace.

5 Coat each lobe of distributor breaker cam with Texaco Rustproof Compound L. Replace distributor cap and seal breather hole in cap with waterproof tape.

6 On ohv engines, remove valve cover and squirt Ursa Oil Heavy Duty on rocker mechanism, interior of valve cover, and between cylinder block and side plate cover.

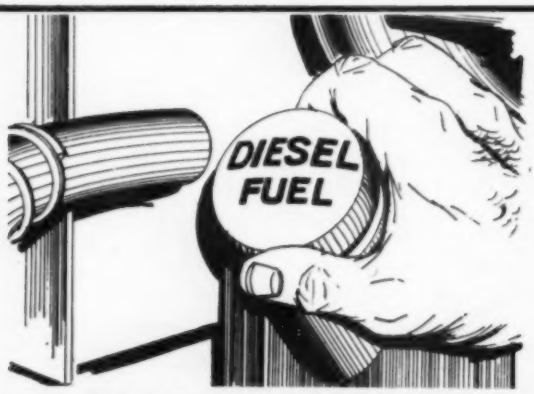
7 On gasoline engines, drain fuel tank, lines, pump, strainer and carburetor. Afterward, close all openings and reconnect all fittings.

8 Remove battery, store it in cool dry place, keep water level up. Recharge periodically. Apply Texaco Rustproof Compound L to battery terminals, leads and container. Loosen fan belt; insert paper between belt and sheaves.

9 Clean and dry outside of engine. Touch up unpainted spots with Texaco Rustproof Compound L.

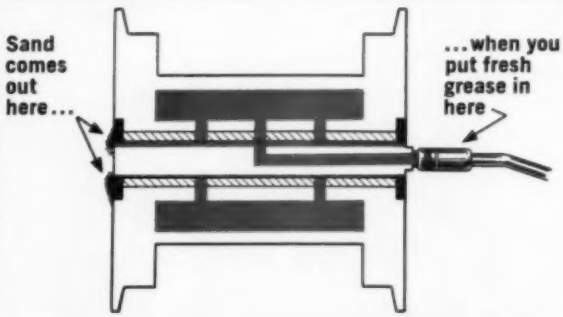
10 Seal engine air intake, breathers, exhaust and exhaust expansion joints with waterproof tape or heavy paper secured with waterproof tape.

11 Tag engine and engine parts with detailed information on rustproof measures taken.



Identify the fuel you want

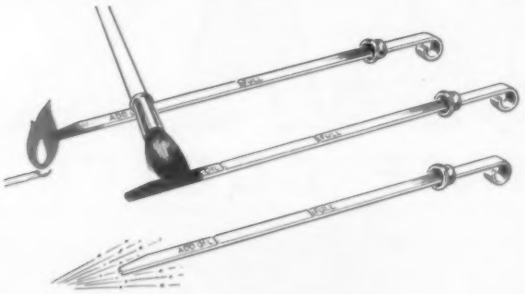
Let one absent-minded maintenance man put gasoline in your diesel tank and as the fliers say you'll be "bailing out over Denver." It's happened. Best way to avoid its happening to *you* is to mark your fill cap; "Diesel Fuel" or "Gasoline." Then nobody should make any mistakes.



Track-roll enemy No. 1: sand

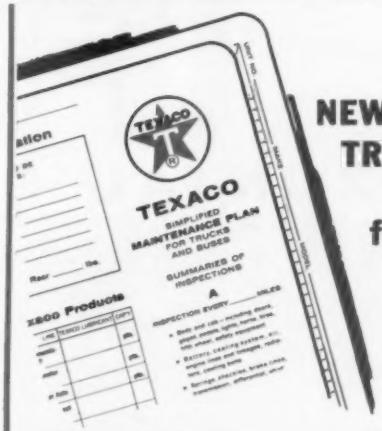
If you're operating a crawler-tractor in sandy soil, the best way to keep sand from getting into the track-roll bearings is to keep purging the bearings with fresh grease. Most track-roll bearing seals are especially designed for this type of purge-lubrication, and the grease that comes out around the edges of the seal during lubrication carries the sand out with it.

efficient maintenance



How to read dipsticks without squinting

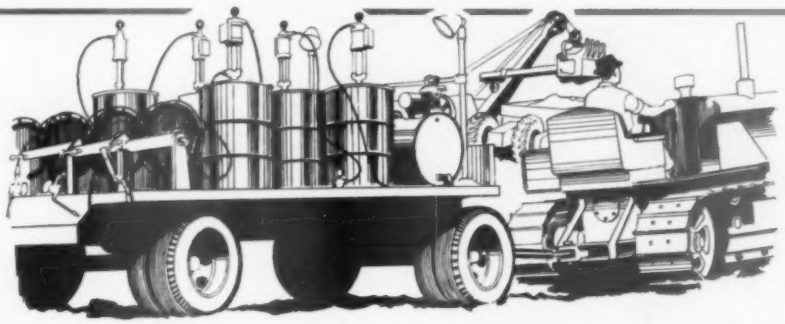
The modern inhibited motor oil that keeps the inside of your engine clean also keeps the oil dipstick clean—and often too shiny to read. Here are three solutions for this problem—take your choice. 1. Heat the end of the dipstick so that the metal darkens slightly. 2. Paint the end of the stick with a dull-finish cellulose lacquer. 3. Run the stick across the spark-plug cleaner to take off some of the shine. (If you use the spark plug cleaner, use the smallest rubber plug bushing and hold the dipstick over the hole with a wad of cloth to keep sand from scattering around the lube box.)



NEW TRUCK RECORD FOLDER fits itself into your schedule

Texaco's flexible new truck record folder lets you stick to the lube schedule that works best for you without running into bookkeeping problems. Lubrication and oil schedules are completely separate from mechanical maintenance and replacement parts schedule—you don't have to follow any pre-established routine to use the folder profitably. And this new folder accounts for every single dollar you spend on truck maintenance for a whole year. Get yours now.

Do-it-yourself lube rig trailer



Maybe you're aware of all the advantages of a mobile lube rig, but just don't want to tie up a truck for this purpose. Or, perhaps you'd like a supplementary rig. You can solve either problem neatly by mounting your field lubricating equipment on a standard 5-ton farm trailer. That way, you can take your whole Simplified Lube Plan out into the field where it's needed, without costly deadheading back to a fixed service point—and you can move the lube rig just by hitching it to any truck, so it's just as mobile as a truck-mounted rig at much less cost. And here's a bonus: by hitching your lube rig trailer to a bulldozer, you can take field service to spots that wouldn't be accessible to a regular truck.

Trailers for this purpose, as well as tanks and pumps, are all standard items you assemble yourself to meet your own requirements.

TEXACO LUBRICATION ENGINEERS

Every month or so we'll bring you a batch of "sleepers", little angles, so easy to overlook, where big savings in money and time can be made. But month in, month out, your local TLE is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control."

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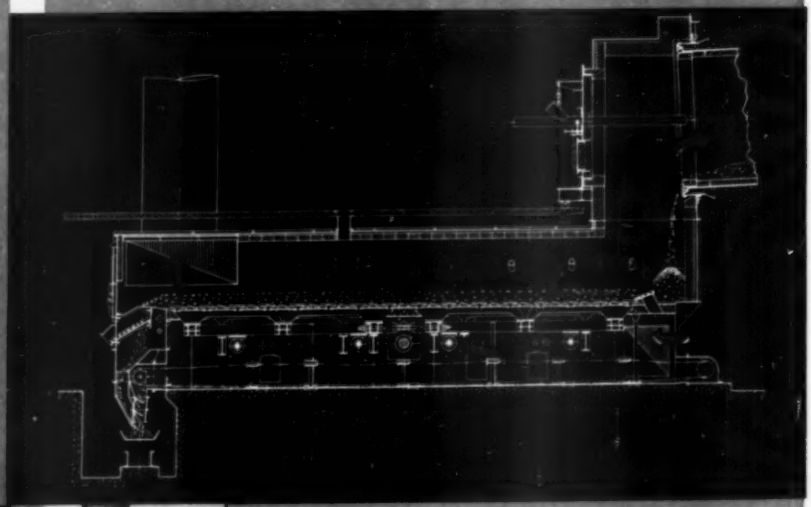
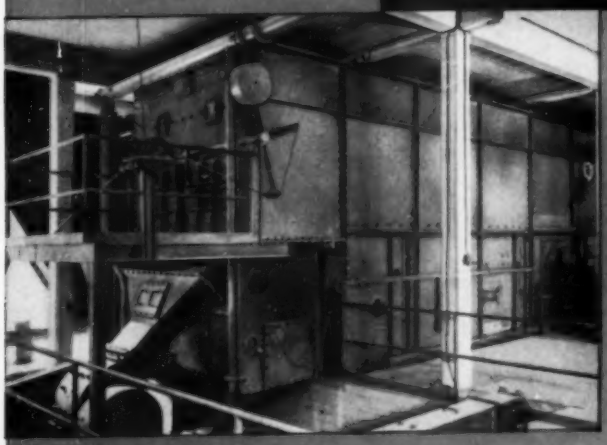
FOLAX

HORIZONTAL GRATE COOLER

FOR CEMENT CLINKER





First Folax Horizontal Grate Cooler installed in 1947. Thoroughly proven design—more than 160 Folax Coolers sold and in operation.

- Extra heavy construction.
- Efficient cooling to low temperatures.
- Bulletin No. FC1059 on request.

F. L. SMIDTH & CO.

INCORPORATED

ROCKEFELLER CENTER

1270 Ave. of the Americas, New York 20, N. Y.

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WHAT'S HAPPENING

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

The low point of housing starts will be passed by year's end. This optimistic conclusion of the Value Line Investment Survey is based on analysis of government statistics. Their evidence points to a probable recovery of the home-building market by mid-1961. Builders are skeptical. Still uncertain of causes of the 26-percent slump from July 1959 to July 1960, they ask, "How good, really, is the underlying demand for new homes?" The report answers that existing demands are sufficient to bring recovery up 10 percent from the low 1960 level of about 1.26-million units. A seasonally adjusted rate of housing starts in August was 8 percent above the previous month. The basic demand, abetted by a recent easing of mortgage money and a more rapid increase in family formation, should support construction of about 1.5-million new units—an average that parallels the 1959 peak.

The trend to pelletizing taconite and low-grade iron ores for use by the steel industry was traced by Wall Street Journal. It predicts that capacity for pellet making will top 14 million tons this year, and reach 30 million tons by 1964. As recently as 1954 capacity was 663,000 tons. Because pelletizing boosts iron yield of low-grade ore above that of good domestic ore, it steps up blast furnace efficiency in steel mills almost 20 percent. Therefore, repercussions are being felt in the mining industry, particularly in the Mesabi range and neighboring ranges in northern Wisconsin and Michigan. They formerly furnished all but about 20 percent of the country's requirement. Now upgraded pelletized ore and increased imports of foreign ore (the latter representing 33.7 percent of ore consumption during the first half of the year) are taking business away from the older mines.

Basalt smelting has become an industry in Czechoslovakia, where two foundries turn out a wide range of products. Outstanding qualities of the basalt castings are resistance to abrasion and corrosion, fitting them for conveyance of hard and sharp materials, such as mining backfill, flue ash, slag, coke or minerals. Suitable for pipe, channels and chutes, the material also is especially good for mill linings. In some instances, service life cannot be estimated because no wear is evident even after several years' service. Static casting has been used to process molten basalt, either in open or closed sand molds. This practice is giving way to casting in metal molds of articles such as tiles, plates, fittings and castings of special shapes. A new procedure has been evolved—centrifugal casting in metal molds rotating at speeds up to 900 rpm.—which turns out items requiring high density.

Not all the king's horses and his men could reassemble Humpty Dumpty, but the British are having success in reconstituting crushed marble. A report from that country concerns a new wall and floor covering, Similpierre. It is a marble that has been crushed and put back together again. Even the colorings and veins found in slab marble are reproduced. Similpierre comes in nine colors and is said to be free of cracking and defects.

What's ahead for highways under the new administration? ARBA analysts say that all signs point to a big push toward amendments to the highway law. In the 1960 Highway Act, Congress merely extended ABC and public-domain highway authorizations for two more years at existing levels. This was in character with the general philosophy of status quo. Proposed amendments to the basic law were discouraged regardless of merit. It figures, therefore, that many knotty matters will be pressed vigorously next year. These include proposed extensions of the Interstate System and the Davis-Bacon Act to cover ABC highway construction, as well as modifications of the Interstate program in urban areas.

A home study course for foremen is now being offered by the National Safety Council. The National Crushed Stone Association described it as a "milestone in safety training." It urged members to give thoughtful consideration to enrolling their foremen and supervisors for the course. The Council's safety engineers developed the program of study to provide a tangible solution to one of the basic problems facing management—making supervisors effective in carrying out their safety responsibilities.

Fluorspar goes into wider orbit in the space age as scientists find new technological uses for the mineral. One of the more important recent discoveries for space vehicles is Teflon, a fluorine-bearing plastic. Its waxy surface is applicable to self-lubricating bearings in which intense heat destroys conventional lubricants. Rockets and space ships will eventually adopt a new solid fuel containing fluorspar. It will replace the present complicated systems using tricky liquified gases.

Farmers in South Africa will benefit from a phosphate find in the northern part of Tanganyika. A 10-million-ton deposit was discovered there recently, reports the Foreign Agricultural Service. It is near a town called Arusha which is close to highways and railroads. Development plans call for the processing and marketing of about 50,000 tons a year. This will be a particular boon to farmers in Tanganyika and Kenya who pay high prices for imported phosphate fertilizer at present.

Pliable putty hardens to a leadlike mass in just 2 hr., according to Industrial and Engineering Chemistry. The material—Devcon L—is 94 percent lead and 6 percent plastic. It can be molded into any shape without heat or pressure, then sawed, drilled or machined. Repairing lead equipment or making radiation shields are leading possibilities for its use.

Hydraulic mining to tap a multi-million-dollar phosphate lode is the crux of an operation underway in the Bayview area of the North Carolina coast. A state geologist reports that two holes are part of the experimental drilling being conducted by an independent operator. Water piped underground through one is used in an attempt to force the phosphate to the surface via the other. Two previous efforts were abandoned by mining firms because they could not evolve an economical method of removing the mineral. It lies 150 ft. below the surface in a 30 or 40-ft. vein. Estimates of the deposit range up to 10 billion tons. Today's market value of phosphate for fertilizer is about $5 a ton.

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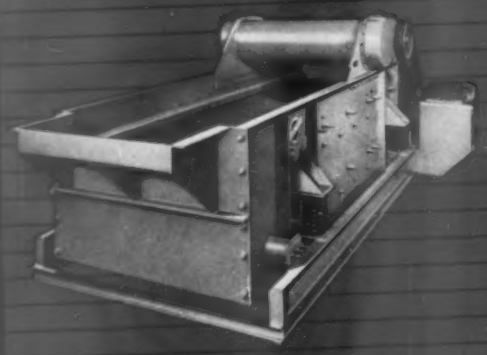

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BULLETIN 291

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- **new space-saving compactness**
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The Allis-Chalmers TL-20 gives you a higher wheelbase to length ratio for added fore and aft stability. You carry big loads at high speeds with minimum spillage.

The 130-hp Allis-Chalmers TL-20 tractor loader gives you the kind of stability you need to move big loads fast over the roughest terrain . . . without tipping or spilling the load. Long 7-ft, 9-in. wheelbase is 43 percent of over-all length with bucket at carry. This gives the TL-20 a higher wheelbase to length ratio than other loaders of this size.

Extra stability is just one reason why you get extra production with the 11½-ton TL-20. Other profit-producing advantages are: *Single-lever speed and direction control; pin-connected axles* that eliminate shifting and rolling under load; *5-way hydraulic filtering* that provides maximum protection; *extra-long reach* for faster and easier dumping; and *well-located dump cylinders* that are up and out of dirt for better performance . . . longer life.

Ask your Allis-Chalmers dealer about the complete line of tractor loaders—5 models—with buckets from 1 to 5 cu yd, 76.5 to 130 horsepower. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

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20

NOTES FROM THE PUBLISHER

November, 1960

Dear Reader:

During 1960 America will spend approximately $14 billion for research and development of products, processes and methods. Although a big chunk of this money will go into our security program which, in turn, will contribute to the economic defense of the U. S., a great sum of it will generate a flood of new, diverse products for consumer use.

The production and distribution barriers we are breaking through today will catapult us into wholly new levels of economy by 1975. Business opportunities of broad dimensions are ready to be blueprinted and activated. Educational programs for training personnel are becoming more necessary as American industry approaches automation.

Not long ago a famed atomic scientist, Edward Teller, predicted underground atomic blasting will someday convert an entire deposit of limestone to a mass of calcium carbide. The principles of using high-frequency electric energy for crushing and crushing-in-place are already well known, and economical production techniques are now being developed. The fuel cell—a radical new power—while not now used in our industry, will someday find a niche for itself. Continuous, virtually unattended loading and hauling may release skilled manpower for more effective work.

These and many more developments indicate a continued, dynamic growth trend in the rock products industry, thereby placing a grave responsibility on sources that are looked to for authoritative information. As a result, ROCK PRODUCTS has increased its usefulness to the industry. Key men turn to its editorial and advertising pages with confidence—knowing the subject matter is timely, dependable and forward moving.

Sincerely,

Philip D. Allen

Philip D. Allen
Publisher

EATON 2-SPEED TANDEMS

give you all the advantages of BOTH

EATON 2-SPEED AXLES

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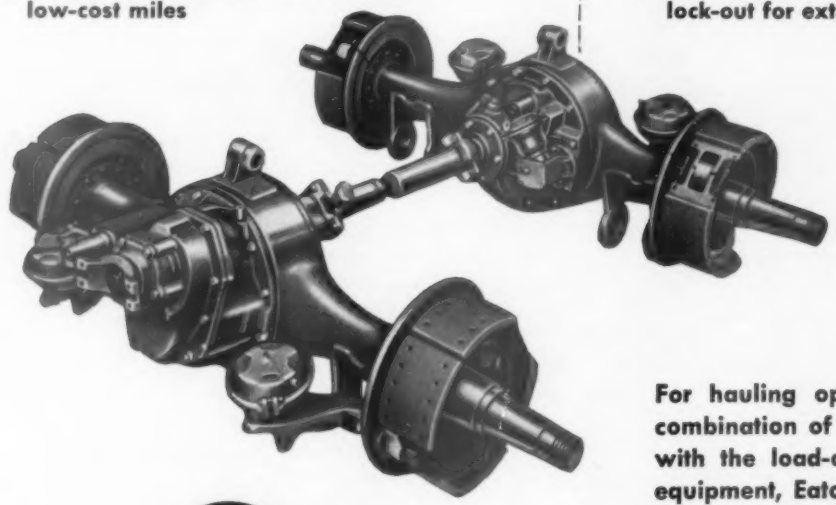
- ★ Low stress and wear on axle, clutch, transmission, and drive line
- ★ Simple, low-cost maintenance
- ★ Long truck life; thousands of extra low-cost miles

and

EATON TANDEM DRIVES

- ★ Short over-all length; maximum strength with minimum weight
- ★ Simplified design; few parts; easy, low-cost maintenance
- ★ Most parts interchangeable with standard Eaton 2-Speed Axles
- ★ No need to match tires; Eaton's inter-axle differential eliminates wheel-fight
- ★ Power equally transmitted to both axles
- ★ Driver-controlled inter-axle differential lock-out for extra traction when needed



Wide range of capacities. Eaton Tandems are also available in Single and Double Reduction types.

For hauling operations which require a combination of speed and power together with the load-carrying ability of tandem equipment, Eaton 2-Speed Tandems make big savings in hauling costs. Ask your truck dealer to tell you about the many exclusive profit-building features you get only in Eaton 2-Speed Tandems.

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AXLE DIVISION

MANUFACTURING COMPANY

CLEVELAND 10, OHIO

EDITORIAL

by GEORGE C. LINDSAY

Safety engineers are indispensable

YOUR MAN IN CHARGE OF SAFETY is a strong man on your management team. He can help you to get the good operation you want, and he can save you money, too. He can, that is, if you give him the proper help and strong encouragement.

John Doe, safety engineer, is a sensible man dedicated to his profession. He's a specialist in several lines—a trained technician, diplomat, salesman, psychologist, economist and humanitarian. His job is tough. But, it's a rewarding one for him, because he's working to reduce human suffering, to save lives and to cut costs for his company.

Or maybe he isn't! If so, you'd better find out why—now.

Could it be that too many in management are giving only lip service to safety? Sad, if true. If it is, the safety man's job is twice as rough, and his attitude is half as good as it should be. It's impossible to get a good job done under those conditions.

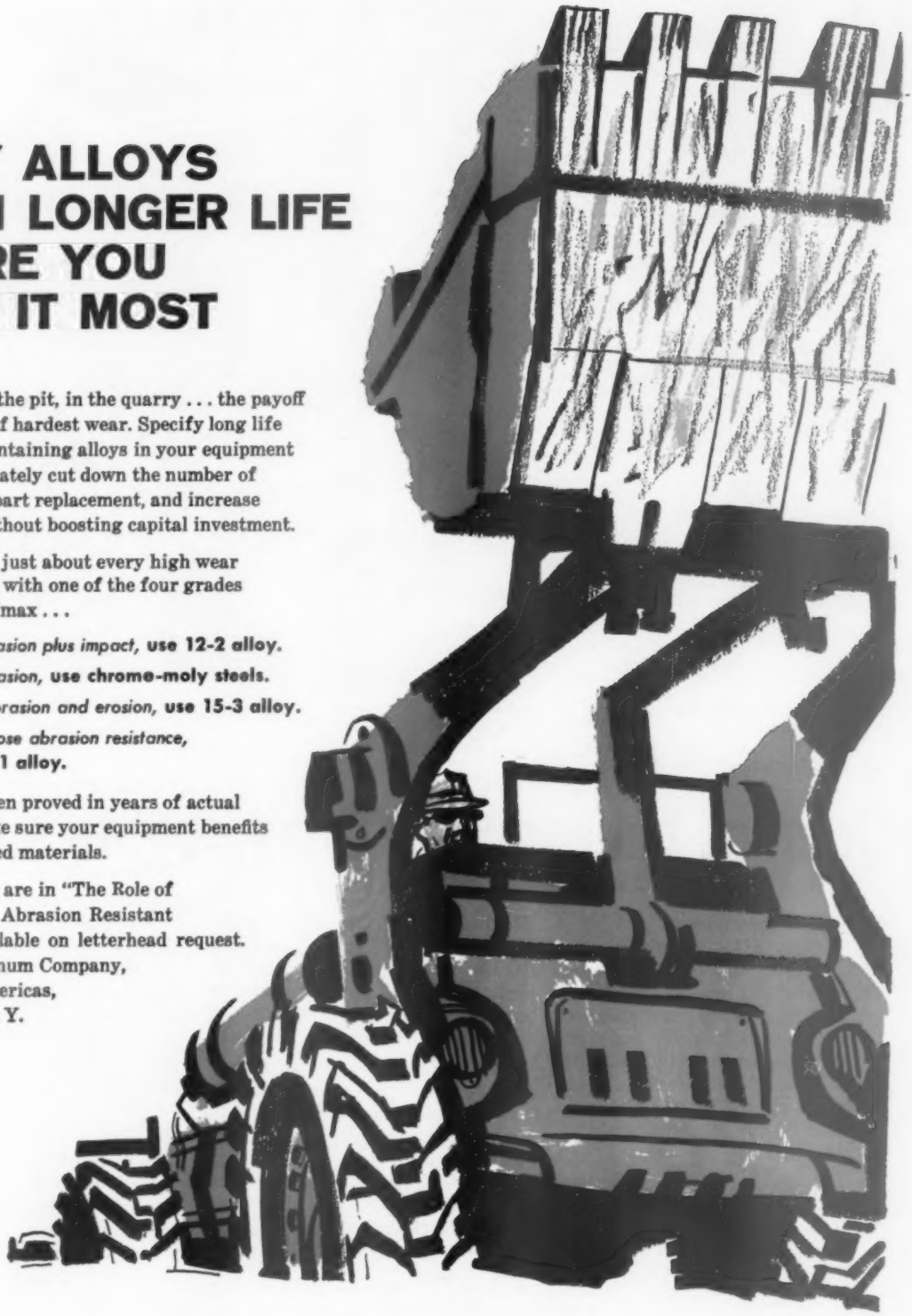
Remember that the safety engineer is in the middle. He has to sell his program up to management and down to individual workers. Not often enough is he singled out for acclaim if he's successful. Many times he's condemned if he isn't. He deserves a better break than that.

Analyze your own safety engineer and the position you give him. Is he getting the proper tools he needs in his trade? Are you encouraging him to do the best job he can—the one you know must be done? Do you really mean it, and believe fully in the need for a top-flight safety program?

If you do, your safety record is good and will get better. If you don't, your safety engineer is in trouble, and so are you.

You can't afford to have on safety work a man who is apologetic about his job, for any reason. He's too valuable to you.

MOLY ALLOYS MEAN LONGER LIFE WHERE YOU NEED IT MOST



In the mine, in the pit, in the quarry . . . the payoff is at the point of hardest wear. Specify long life molybdenum-containing alloys in your equipment and you immediately cut down the number of shutdowns for part replacement, and increase productivity without boosting capital investment.

You can satisfy just about every high wear rate application with one of the four grades developed by Climax . . .

For gouging abrasion plus impact, **use 12-2 alloy.**

For grinding abrasion, **use chrome-moly steels.**

For scratching abrasion and erosion, **use 15-3 alloy.**

For general purpose abrasion resistance, **depend on 3-2-1 alloy.**

All four have been proved in years of actual mining use. Make sure your equipment benefits by these advanced materials.

Complete details are in "The Role of Molybdenum In Abrasion Resistant Materials", available on letterhead request.
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Crushes old concrete to aggregate subbase

"We crush old concrete into 2½-in. aggregate for a subbase on asphalt and stone parking areas. Our portable Lima Austin-Western 2036 primary jaw crusher turns out a high daily tonnage with an absolute minimum of maintenance. We also have a Lima A-W apron feeder on another plant. The feeder has doubled production.

"Based on our experience with the crusher, feeder, and an Austin-Western grader, I'd say that the Baldwin-Lima-Hamilton Corporation turns out quality products which hold up longer and do better jobs than most competitive equipment."—*George H. Souter, Gargaro & Souter, Inc., Detroit.*

Lima Austin-Western offers a complete line of top quality crushing, screening and washing equipment. The finest materials, skilled workmanship, simplicity of design, and engineering experience are reflected in performance records. Depend on Lima Austin-Westerns for accurately sized gravel in quantity and years of trouble-free service. Choice of compact, self-contained portable units or custom-engineered stationary installations. Both types assure you high-speed operation and lower tonnage costs. Ask a Lima A-W owner. See your nearest Lima Austin-Western distributor for facts and figures. Or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

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Limas charge batching plants for 120 different concrete mixes...

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"Maintenance costs are very low—less than 4% of the purchase price of the machines"—*Harold H. Winterrowd, plant superintendent, Anderson Concrete Corp., Columbus, Ohio.*

For heavy duty rock digging, handling bulk materials, or whatever the job, there is a Lima best suited to the application. Shovels to 8-yd., draglines variable, and cranes to 140 tons on crawlers, 80 tons on rubber.

For reliable high production with low operating and maintenance expenses, you just can't beat Limas! That's because they are better designed and better built of better materials. In a word, Limas are *better* all around than competitive machines. And we can prove this to your satisfaction. For facts and figures, see your nearby Lima distributor or write construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Lima Type 34 Crawler Mounted Clamshell, one of four LIMAS that help keep the 77 radio-controlled mixer trucks on the move.

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ROCKY'S NOTES

by NATHAN C. ROCKWOOD

*The Chemistry & Physics of the Earth**

ABOVE IS THE TITLE of a new book which aroused our curiosity. Surely, those of us who are endeavoring to apply chemistry and physics to products of the Earth's crust should be interested. We find our book to be Vol. III of a series, published yearly, designed to collect and correlate the latest studies of "those branches of natural science which border older established disciplines where the need for critical survey reviews of progress has become greatest. This has arisen partly because subjects such as geochemistry and geophysics fringe and overlap so many other fields and partly because they are at present vigorous growing points in science. The principal aim of the annual series will be to provide authoritative and up-to-date surveys of progress for those actively engaged in geophysics and geochemistry. But it is hoped also that much of what is written will encourage the interest of the chemist and physicist in a study of our planet, not merely for its own sake, but because such a study often turns out to be of benefit to physics and chemistry." That is the preface written by the editors: L. H. Ahrens, Cape Town University; Frank Press, California Institute of Technology; Kalervo Rankama, University of Helsinki, and S. K. Runcorn, Kings College—chemistry and physics professors from South Africa, the U.S.A., Finland and England.

Two of the eight papers included deal with recent explorations of the ocean floor off our Atlantic Coast; one with attempts to determine past climatic conditions on our planet, and two with other geochemical problems. In a paper on geochemistry in Russia are several pages of references to recent work there on a variety of subjects, but the briefs do not give much information. Only three of the papers would seem to fulfill the purpose of the editors, as quoted above.

All of us with an elementary knowledge of chemistry probably have some curiosity as to the origin of the 100 or so chemical elements now known to exist. Hence, a paper on "The Origin of the Elements," by A. G. W. Cameron, Atomic Energy of Canada, Ltd., has some interesting speculations or theories. To do this, chemists, physicists and astronomers rely on what has been discovered as to the composition of the stars—since the stars we see are known to be other worlds like ours, either in the making or disintegrating.

The author states: "These observations suggest very strongly that the elements heavier than hydrogen have been synthesized from hydrogen by nuclear reactions in stellar interiors and that the products so formed have been incorporated in the newer stars."

Such a conclusion thus involves estimates of the age of the stars; and there are ways of doing this. For example: "Very massive stars have such high luminosities that their nuclear fuel sources must be exhausted in times, short compared with the age of the universe. The age of the [our] solar system, and presumably also of the sun, has been found to be 4.5 x 10^9 years by means of the relative abundances of the lead isotopes in different meteorites." With the help of nuclear chemistry it is now possible to theorize what takes place in the interior of a star and in the interstellar space. Very high pressures and temperatures are involved, such as in the explosion of a hydrogen or nuclear bomb. It is interesting and heartening to realize that the knowledge of nuclear chemistry is serving other purposes than prospective but premature destruction of our planet.

The only paper that might be of practical value to researchers in our industries is "Silicate Melt Systems," by Edwin Roedder, U. S. Geological Survey Laboratories, Washington, D.C. A few research people in the cement industry do work on the kind of silicate melts that are presumed to

Please turn to page 118

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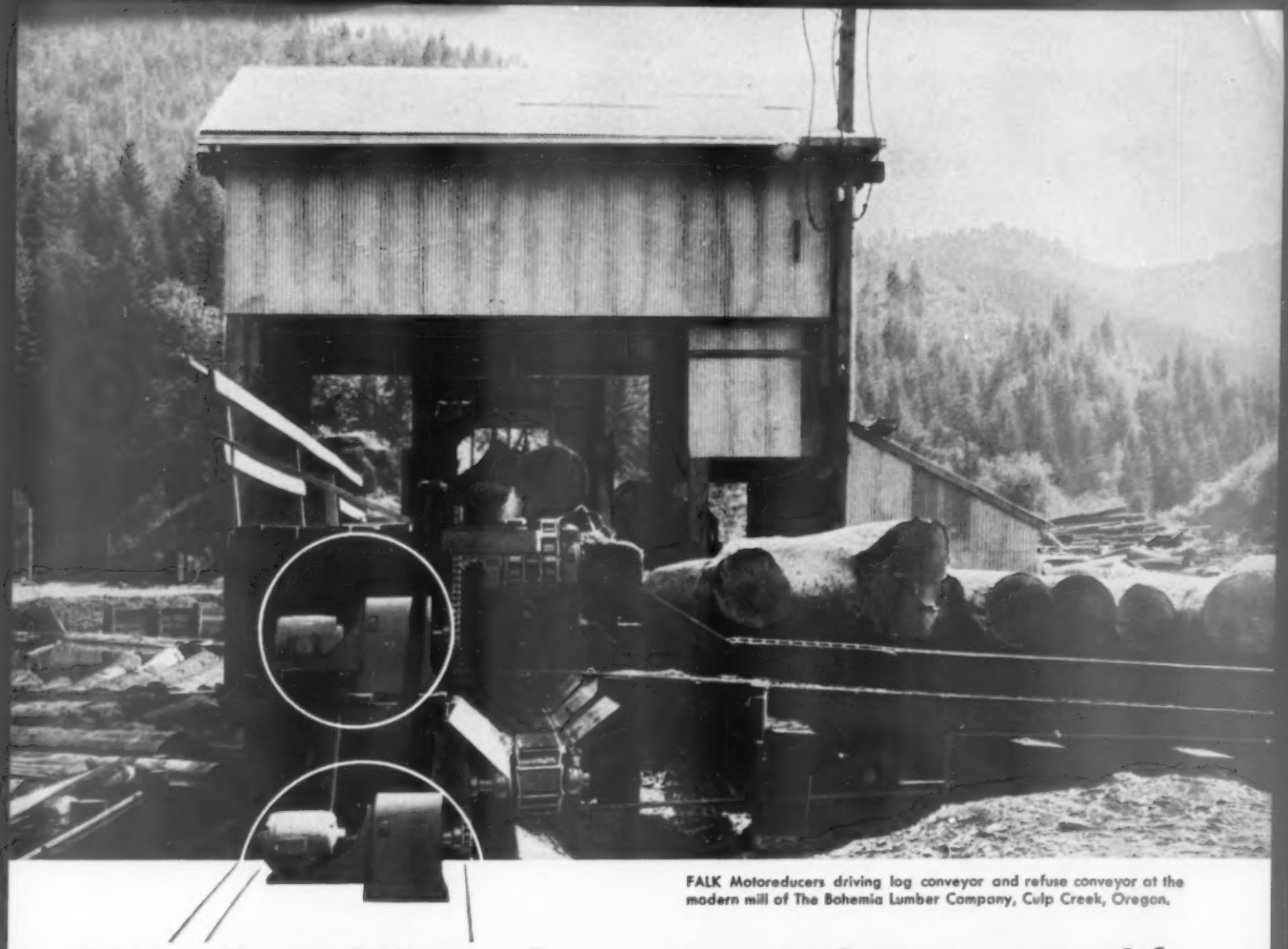

FALK Motoreducers driving log conveyor and refuse conveyor at the modern mill of The Bohemia Lumber Company, Culp Creek, Oregon.

FALK *all-steel* Motoreducers give you longer service life

Whether your load conditions are normal or heavy, the extra rigidity of all-steel construction (more than twice that of cast iron) maintains better alignment of revolving elements under load...a vital factor in prolonging the service life of gears and bearings.

And if your installations are subject to shock loads, or accidental external impacts, you're way ahead when you install Falk All-Steel Motoreducers. These rugged units do not destroy themselves by tearing off their feet under jamming overloads, nor are their housings subject to cracks which both dissipate the vital lubricant supply and allow revolving elements to get out of alignment.

All-steel construction is one of the built-in extras that you get in Falk Motoreducers. Others include: (1) inherently stronger gear teeth (by AGMA standards), thanks to exclusive Falk extra-depth, high pressure angle helical gears; (2) maximum mechanical efficiency (98½% per gear mesh, under full load); (3) your choice of standard units (horizontal, vertical or right angle) to fit your precise requirements.

HORSEPOWER RANGE: to 75 hp . . . STANDARD OUTPUT SPEEDS: 780 rpm (high) to 1.2 rpm (low).

Prompt delivery from distributor stocks, or from warehouse or factory. Ask your Falk Representative or Authorized Falk Distributor for ***Bulletin 3100.***

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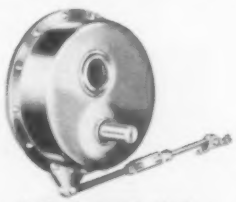

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"new H-90B PAYLOADER® loads out 200 yds. per hour"

two H-90B's serve at pit and stockpiles for *Roy L. Houck Sons Corp.*

The dependability and superior work-ability of Model H-90B "PAYLOADER" tractor-shovels have been thoroughly proven by two of the units at Roy L. Houck Sons Corp. aggregate plant near Eugene, Oregon.

AT THE CRUSHER — for general purpose work, excavating, maintaining haul roads and stockpiles. In emergencies, when their power shovel fails, the H-90B moves in to load raw rock and gravel into haul units . . . loading at a rate of 200 yds. per hour from stockpile.

AT THE PIT — the other H-90B loads haul trucks with finished materials for a new freeway being constructed between Albany and Eugene.

What makes the H-90B "PAYLOADER" outstanding?

Hough has engineered many superior design, construction and performance features into this 9,000-lb. operating capacity "PAYLOADER", such as: POWER — a new turbo-charged diesel engine that develops ample horsepower (162) to handle traction and *all* hydraulic requirements at the same time . . . STABILITY — Longer wheelbase, wider tread *plus* added machine weight to provide a "balanced-stability" factor for *any* working condition . . . STRENGTH — Design improvements and use of alloy steels in critical structural parts gives the H-90B a greater "work range" potential than any unit of comparable size . . . OPERATION — Improved full power-shift-transmission with matched torque converter results in quicker throttle responses and faster operating characteristics . . . SAFETY — Power air brakes on all four wheels, dual cylinder power steering, dual brake pedals and single lever power-shift . . . all add up to fatigue-free operating effort for fast operating cycles.

A size for every need!

In order to fit your exact plant requirements, you have a choice of five 4-wheel drive "PAYLOADER" sizes, ranging in operating capacities from 3,000 to 12,000 lbs. Each model is outstanding in its class and all are available with regular buckets or the patented Drott "4-in-1" that functions as a shovel, clamshell, scraper or bulldozer. Ask your Hough Distributor to help you select the "PAYLOADER" that best fits your needs.

Power, traction, tip-back bucket action and bucket design combine to dig full bucket loads in a hurry.

Dumping clearance of 9'11"—more than any machine in its class—loads trucks easier, stockpiles higher.

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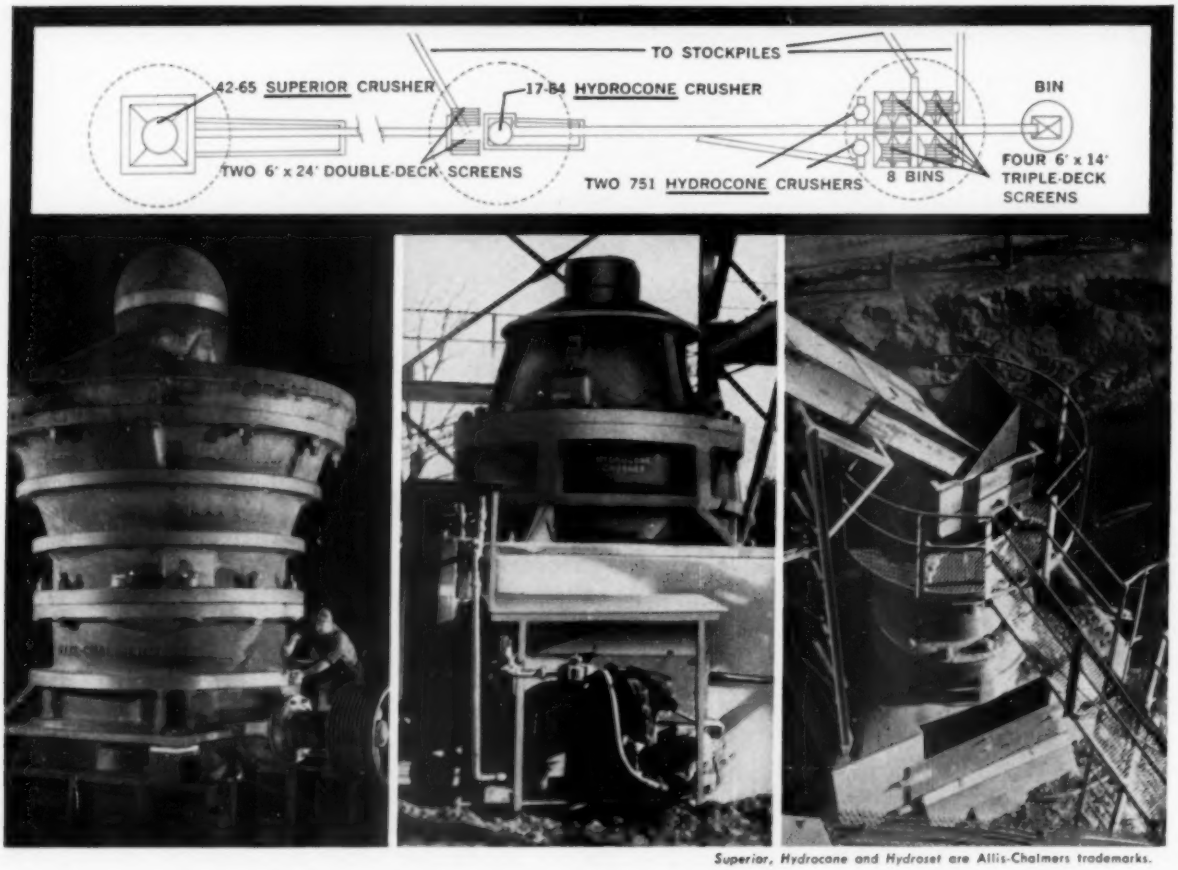


Superior, Hydrocone and Hydroset are Allis-Chalmers trademarks.

Rugged Hydroset control sets a fast pace for crushers:

900,000 tons in 4½ months!

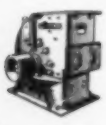
Crushing trap-rock is a tough assignment. A tight time schedule makes it even tougher for Chantilly Crushed Stone Company. They were awarded the contract for all of the crushed stone — base course and concrete specification stone — for the new $75,000,000 John Foster Dulles Airport just outside Washington, D. C.

To meet production requirements, they had to have crushers that were rugged and dependable. Crushers that would provide rapid compensation for the wear that always accompanies the crushing of trap-rock. Crushers that would *not* require extensive downtime to unload in the event of power failure.

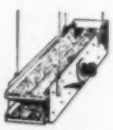
To get the job done, Chantilly built their plant around four Allis-Chalmers crushers: a 42-65 *Superior* gyratory for primary crushing, a 17-84 *Hydrocone* crusher for secondary crushing, and two 751 *Hydrocone* crushers for tertiary crushing. All four crushers were equipped with *Hydroset* control.

It was *Hydroset* control that made compensations for wear in minutes, not hours... made the quick changes in product size from base course to concrete specs.

Ask your A-C representative about the rugged flexibility of A-C crushers equipped with Hydroset control. Or write **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wisconsin.* A-1336

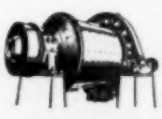


Hammer Mill



Vibrating Screen

Jaw Crusher



Grinding Mill

Kiln

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WASHINGTON LETTER

by EDGAR POE

Demos would Kill state Work laws

The AFL-CIO's Committee on Political Education (COPE) is conducting a hard-hitting campaign against right-to-work laws in 19 states. The organized labor union leaders want the laws repealed and they have set about to do something about it. The 1960 Democratic platform adopted at the Los Angeles Convention makes the flat and unequivocal statement: "We will repeal the authorization for right-to-work laws, limitations on the right to strike, to picket peacefully and to tell the public the facts of a labor dispute . . ."

This plank was adopted under the pressure of powerful unions. The rights of the states are being whittled away all the time. If right-to-work authorization to the various states is repealed, it would give big labor leaders more power to dictate the kind of government they want in this country.

Senator Harry F. Byrd of Virginia declares emphatically that "power breeds power, and labor leaders are insatiable in their demands for special privilege and special legislation for immunity." He declared that labor leaders such as Reuther, Meany, Hoffa and McDonald will leave nothing unturned in an effort to get a federal law passed that would wipe out the rights of the states to protect the freedom of individuals in their efforts to earn a living.

Senator Byrd maintained that the Democratic platform language is a clear and positive pledge to the powerful labor chieftains that the Democratic party will seek repeal of the authorization to the states for their authority to have right-to-work laws on their books.

The 19 states that now have laws that have right-to-work laws are Nevada, Kansas, Indiana, Alabama, Mississippi, Louisiana, Arizona, Nebraska, Florida, Iowa, Texas, Utah, North Dakota, Virginia, South Dakota, Georgia, Arkansas, South Carolina and Tennessee.

"I regard the right to work," said the distinguished Virginian, "as I do the right to life, liberty and the pursuit of happiness. It is the right, the responsibility and the duty of the states to protect this fundamental freedom."

"Existing federal laws already legalized collective bargaining contracts making union membership a condition for employment wherever it is not prohibited by state law. States have enacted laws to provide that the right of individuals to work shall not be denied on account of either membership or non-membership in labor organizations.

"Fullfillment of the Los Angeles (Democratic National Convention) pledge would enable the Warren Court (U. S. Supreme Court) to strike down all of these state laws and, freed of the Congressional restriction, I suspect the Warren court would act promptly."

The senior Senator from the Old Dominion State pointed with pride to the 13-year-old right-to-work statute in his state. He said the Virginia statute would probably be one of the first to be declared invalid by Chief Justice Earl Warren and his associates. The Tuck law provides that neither union membership nor non-membership in labor organizations shall be made a condition of employment in collective bargaining contracts.

Fringe Benefits Growing

Fringe benefits are rising all the time. The U. S. Chamber of Commerce's seventh report on the subject which covered employes of 1,064 big and little business firms throughout the country showed that the average fringe benefits in 1959 per employe amounted to $1,132. The study also showed that fringe benefits doubled between 1947 and 1959.

The Chamber found that employes averaged $22.80 in fringe benefits for every $100 in wages. The breakdown shows:

Social Security, unemployment compensation, workmen's compensation and other legally required employe benefits: $4.20; private pension and insurance programs, separation pay and other agreed-upon payments: $7.20; paid vacations, holidays, rest periods, sick leaves and other payments for time not worked: $9.60; profit-sharing payments, bonuses and similar payments: $1.80.

Nearly 90 percent of the companies had employe pension programs. All but two percent of the 1,064 firms offered insurance programs and paid vacations.

Pollution Control Parley set

Surgeon General Leroy E. Burney of the Public Health Service has called a national conference on water pollution control in the Nation's Capitol December 12, 13 and 14, because pollution of our water resources has created one of the most serious domestic problems facing this country.

Dr. Burney declares that construction of water supply and pollution control facilities has lagged far behind national needs since the start of World War II. With the population increasing all the time, the pollution problems are expected to grow. It is urgent that planning start now.

The conference was suggested by President Eisenhower in an effort to develop views designed to aid in formulating a goal for the new Congress and the new Chief Executive of the United States which will take office in January.

Pollution Research Extended

The Public Health Service has additional investigative powers under the extension of the Air Pollution Research Act approved by Congress. As requested by the Secretary of Health, Education & Welfare to strengthen federal efforts, the new legislation authorizes the calling of public hearings on pollution problems which are of more than local significance. The law does not give any federal agency any regulatory or police powers, but allows the surgeon general to obtain the views of special boards on acute conditions.

Compact Car trend Is watched

Official Washington is watching for a possible impact that the compact car may bring about. Thus, there is not sufficient information available to point to any definite, clear cut trend. It will take some time. The compact car apparently means less profit for the oil companies, and less tax money for the federal, state and local governments. Meantime, the Bureau of Public Roads and its parent, the Department of Commerce; the Treasury Department, Department of Labor and Congressional Committees are scrutinizing all information obtainable on the subject of compact cars.

Facts that have emerged from compact cars are it costs less to operate these vehicles, and it costs less to build them. A spokesman for the Automobile Manufacturers Association in Washington predicts that the 25 percent of the total automotive production in 1960 will jump to at least 40 percent in 1961. Production apparently is headed for at least 50 percent of the total market. The petroleum industry is apprehensive over the ramifications, but the automotive industry believes that more and more automobiles, even though they are compact vehicles, will take up any slack in fuel consumption.

With the German-made Volkswagen continuing to lead the field, records show that during the first four months of 1960, new foreign car registrations amounted to 181,781. Volkswagen registrations January through April totaled 52,294, with the French-made Renault the runnerup with 27,393. The Automotive Manufacturers Association believes that imports will become stabilized at around 500,000 cars a year.

Twenty thousand Road contracts Are supervised

Representative John A. Blatnik, chairman of a Special House Public Works Subcommittee investigating the Federal Aid Highway Program, says each day's mail brings new allegations of shameful malpractices. As a result, it takes considerable time and expense to check on the allegations to determine if they have any substance.

The Bureau of Public Roads is supervising more than 20,000 contracts. Therefore, Subcommittee members have abandoned completely any idea that a short-range scrutiny of this colossal program will produce any cure-all legislation.

It now appears that the Blatnik Committee will grow in legislative investigative importance. The Minnesota Democrat asserts that many areas remain to be explored, and many studies remain to be undertaken.

"Both political parties are in agreement on the necessity for the Federal Aid Highway Program," he said. "It is vital to the national economy. But with billions of dollars of taxpayers' money involved it is the unquestioned duty of Congress and the Executive Branch of the government to bend every effort to see that every dollar invested in these highways gets a dollar's worth of roads."

Representative Blatnik said his Committee proposes to conduct a searching inquiry into the purchase of right of ways, which has been a thorny problem; charges of collusive bidding practices and possible excessive use of private consulting engineers. The Committee also has before it allegations of monopolies in the supplying of road construction material.

"These are but a few of the areas which will claim the attention of the Subcommittee in the months to come," said the Minnesotan.

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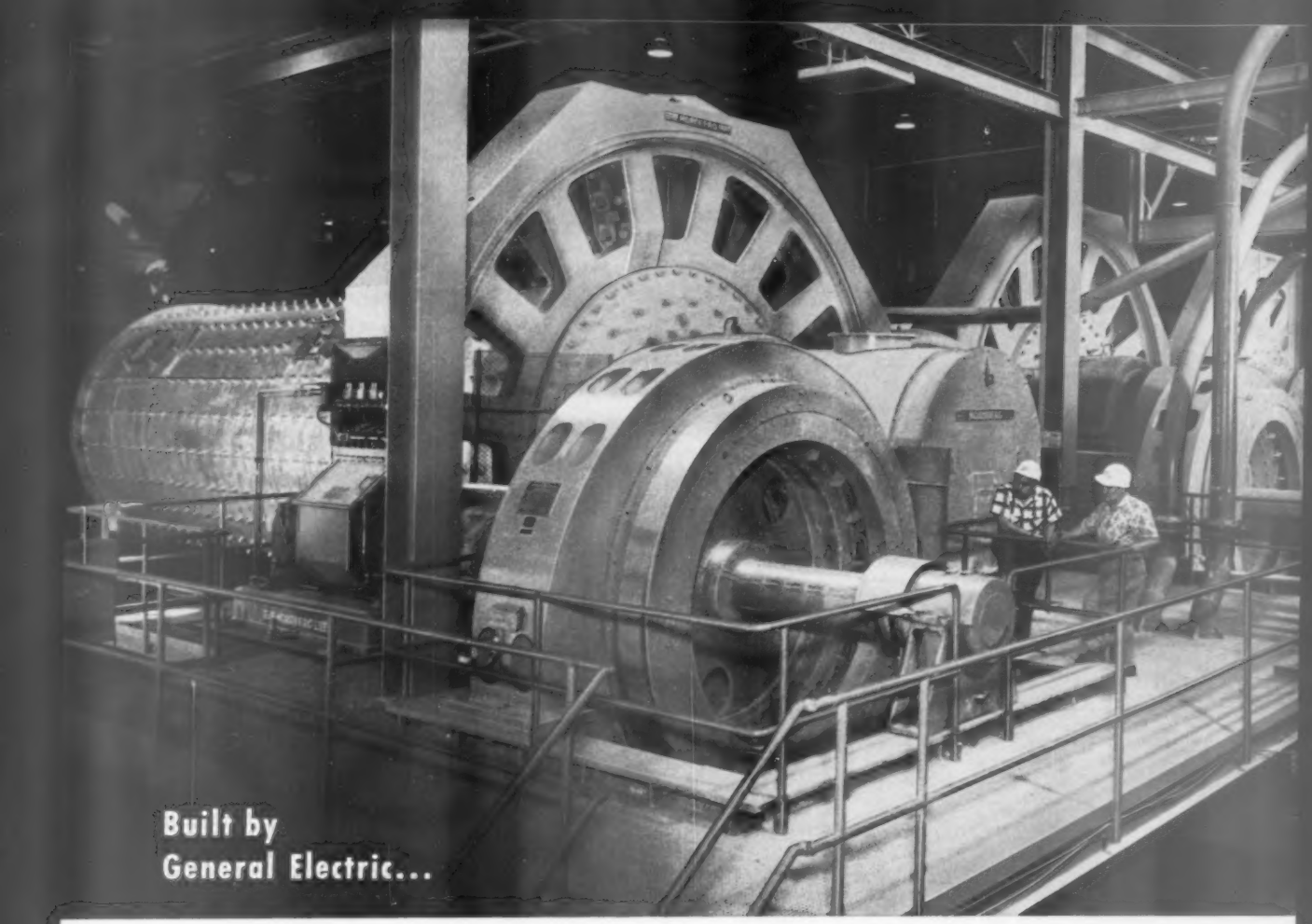


WORLD'S LARGEST Ball-mill Motors Power Huge Cement Grinding Mills

Dundee Cement Company chose General Electric to supply the motors for the largest five ball-mills in the world at its new plant in southeastern Michigan, one of the most modern plants of its kind in the world.

Each of these massive mills contains 400,000 pounds of steel balls plus the tons of material to be pulverized. To drive these immense loads, General Electric designed and built into five 2500 horsepower synchronous motors the "know-how" gathered from years of experience with ball-mill motors.

Each motor provides the torque to start the enormous load from standstill, yet causes minimum voltage disturbance of the power system. It can withstand the adverse conditions of dust and heat and run for long periods without shutdown. These G-E synchronous motors were literally tailor-made to meet all the requirements of ball-mill service.

Engineering and manufacturing experience obtained by General Electric in building hundreds of motors for ball-mill drives, and the proved, dependable performance of G-E synchronous motors on all types of heavy-duty applications, assure you of motors that will withstand unusual demands and require only a minimum of maintenance.

The next time you need drive motors for heavy, continuous-service equipment, be sure to call in your General Electric Apparatus Sales Engineer.

In the meantime, you can obtain more information on G-E synchronous motors by writing for GEA-5959, Section 775-13, General Electric Co., Schenectady 5, N. Y.

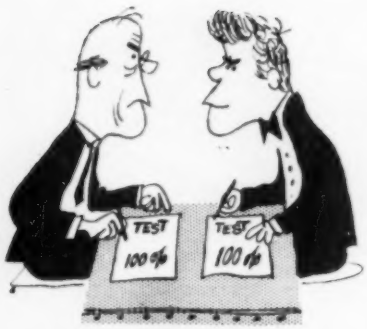
LARGE MOTOR & GENERATOR DEPARTMENT

GENERAL ELECTRIC

LABOR RELATIONS

A ROUNDUP OF ACTUAL DAY-TO-DAY IN-PLANT PROBLEMS AND HOW THEY WERE HANDLED BY MANAGEMENT MEN

How would you decide?



Can you promote a junior man even though he gets no better test score than the senior worker?

What Happened: When a vacancy opened up, a senior and a junior man applied. They were each given a test in which they scored about equal. Yet the company did not select the man with the higher seniority. Instead, it studied the past performance records of both men and decided that the younger man was more stable. The older man took his grievance before an arbitrator. He said:

1. The company rule states that where ability of two men is equal, length of service will prevail.
2. In the test I came out okay.
3. I'm entitled to an opportunity to make good.

The company responded:

1. Tests are only one standard for evaluating an employe.
2. The junior man's past record is superior. He produced more—his quality of work was better. His interest and attitude were higher.

Was the company:
Right? ☐ **Wrong?** ☐

What a Board of Arbitration ruled: "In making such comparisons the company is entitled to use tests so long as they are reasonable and valid for the purpose at hand. It is true that both men passed the screening tests for the job, but the Arbitrators are convinced that there is a real difference in the performance records of the men. The unrefuted testimony of the company is to the effect that John Kury, the senior man, had in the past requested a demotion, refused a promotion, been officially reprimanded for poor quality and quantity of work and was adjudged by the supervisor to be a 'borderline' worker. In contrast, Hewitt, the junior man, had received no reprimands, his work was rated 'good' both as to quality and quantity. He was eager to be promoted. It is the Board's opinion that a real difference did exist between the two men. After careful consideration it is awarded that the selection of Mr. Hewitt, the junior man, for the promotion was not discriminatory; the company was justified in its decision."

Must you let an employe finish his trial period?

What Happened: The company had the following policy: "If the employe does not make satisfactory progress during the 15-day trial period, he shall be laid of."

Bert Shlusser was tried out for a job. The company had a certain standard for output. Most of the employes who were tried out in the job met the standard. But Bert was slow. At the end of five days the company was fully convinced that he wouldn't make the grade, and let him out for failure to meet the minimum standards.

The case went to arbitration where the union argued:

1. An employe must be allowed to finish a trial period.
2. The employe was making some progress. Management must wait before making its decision.

The company stood on its right to direct the workforce and to make judgments as to an employe's potential.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Bradley ruled: "The company has the right to establish standards for trainee employes. This practice is justified in the interests of efficient and economical operations. If an employe does not meet qualifying standards any time during the trial period, the company can take action."

Does management have the right to reduce the work-week?

What Happened: Because of a strike at one of their supplier's plants, the company didn't have enough materials on hand to keep all the workers occupied. Instead of a layoff, the company decided to go on a 4-day week. This would keep all of the employes on.

"You can't do this," said the union. "We have a clause in the contract which says that the work week should be 40 hr. a week. That definitely means that the hours for the week cannot be reduced. If you must reduce on production, then use layoffs so that senior men will still have that 40-hr. week."

The company took exception to this. That 40-hr.-week clause is not a guarantee. It's just a statement of general policy to indicate when overtime starts. Furthermore, as the management, we are the ones to decide what the work-week is.

Was the company:
Right? ☐ **Wrong?** ☐

What Arbitrator Gamser ruled: "The right to relieve or lay off employes from duty because of lack of work or other circumstances is a management right. A clause defining the work-week as being 40 hr. cannot be regarded as a guarantee of employment for all or any particular group of employes for any specific number of hours per day."

END

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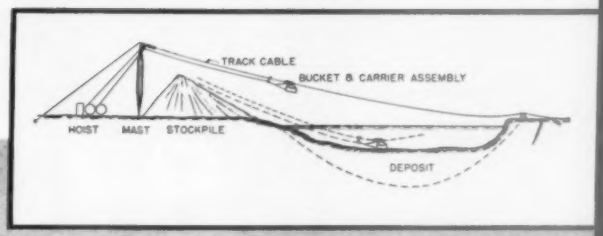
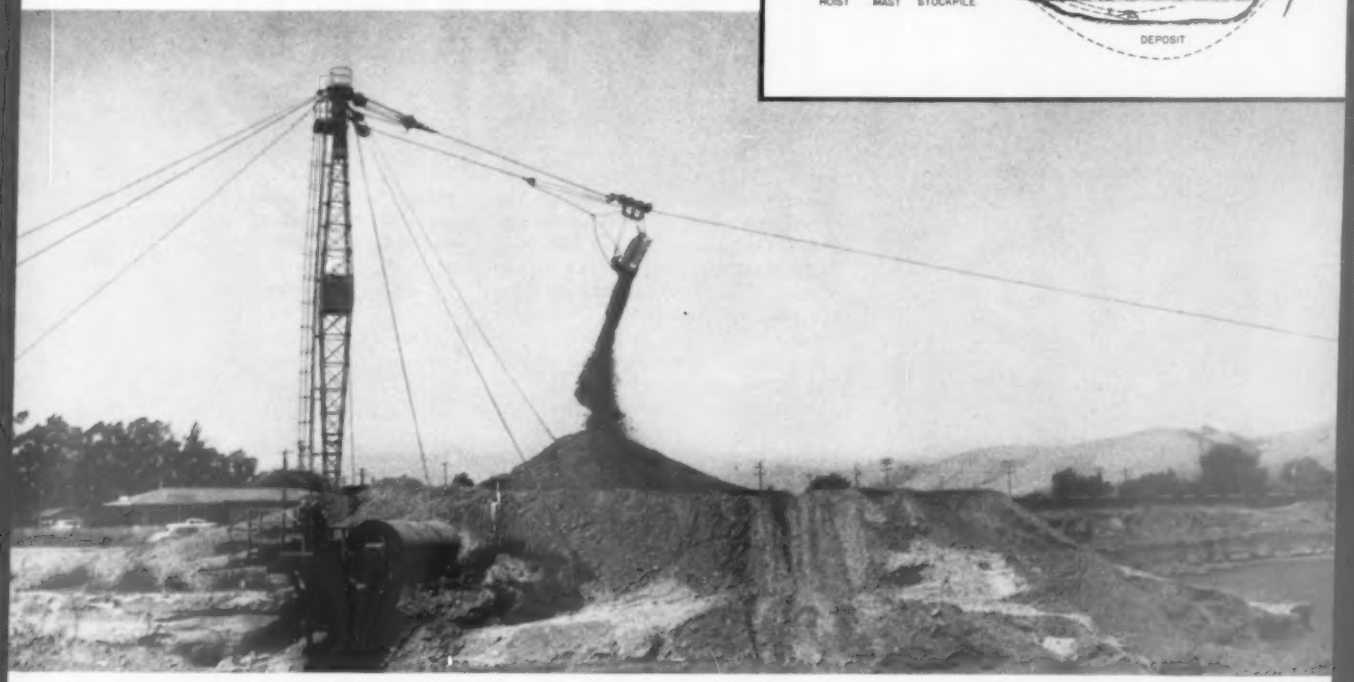
GET ALL THE MATERIAL OUT OF YOUR PIT

A Sauerman Slackline Will Recover It For 6 Cents A Ton





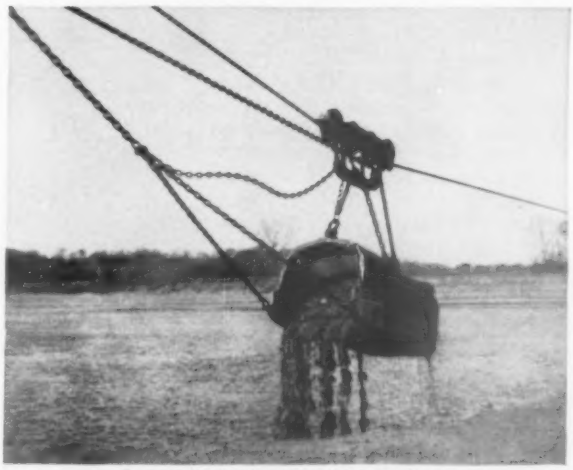
Plants Like This Are Turning Hard-To-Reach And Deep Materials Into Increased Profits

One way to beat increasing land values and depleting resources is to get all the material out of your present deposit. You can do this with a Sauerman Slackline Cableway. The machine starts at ground level and continues to work at depths and distances that cannot be reached with other excavating equipment. A Slackline will dig 100 feet below water and haul loads over 1000-ft. spans.

A Sauerman Slackline beats rising operating and labor costs, too. It provides what is probably the most economical of all excavating and hauling methods. Operating costs as low as 6 cents per ton for labor, power and maintenance are frequently reported.

Another advantage of the Sauerman Slackline is that it can be operated continuously in all types of weather. This permits building a ready stockpile to meet seasonal or unforseen demands.

If you are starting a new plant or updating an existing one, do it with the machine that gets the most out of your deposit at lowest possible cost. Sauerman Slacklines are built in sizes up to 3½ yds. to match your tonnage requirements. Write or call about your deposit. We'll recommend the proper machine.



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PEOPLE IN THE NEWS

Warner Co. appoints general managers

IRVING WARNER, JR. (left) has been appointed general manager of the lime division of Warner Co., Philadelphia, Pa., and Francis V. J. Haggerty has been named general manager of the construction materials division. Both Mr. Warner and Mr. Haggerty will be responsible for sales and operations.

Mr. Warner joined the company in 1946 as an industrial engineer. In 1950 he transferred to the Morrisville area as resident plant manager. In 1957, upon the retirement of Alexander Foster, Jr., Mr. Warner was appointed operations manager of the construction materials division, which position he held until his appointment to the lime division. He has been a member of the board of directors since 1955.

Mr. Haggerty started as a shipping clerk in the Wilmington division in 1934, then transferred to the sales department. In 1946 he was appointed manager of the division, in charge of both operations and sales, and when the new plants at Chester, Pa., and Porter, Del., were acquired in 1950, he was placed in charge. In 1957 Mr. Haggerty was named general sales manager of the construction materials division, which position he held until his recent appointment.

Rock Products staff appointment

ELEANORE PAGE HAMILTON has been named assistant editor of ROCK PRODUCTS. She has been a regular contributor to various magazines and was formerly an editor at Stamats Publishing Co., Cedar Rapids, Iowa. Much of her writing has been in the home-building field, most recently as associate editor of New Homes Guide and Home Modernizing magazines.

Mrs. Hamilton is a graduate of Milwaukee-Downer Seminary, Milwaukee, Wis., and attended Ohio State University where she majored in art. She also studied journalism at the University of Wisconsin Extension and at Northwestern University, and has taught classes in radio writing. In 1959 she was elected to Zonta International, world-wide executive women's organization, and serves on the board of the Chicago loop chapter.

Charles Adams elected Huron Cement director

CHARLES M. ADAMS, vice president in charge of operations of Huron Portland Cement Co., Detroit, Mich., has recently been elected to the board of directors.

A native of Spokane, Wash., Mr. Adams attended the University of Washington and received his BS degree in civil engineering from the University of Michigan. He joined Huron in 1941 as assistant superintendent of plants. In 1954 he was named manager of distribution and two years later became assistant manager of operations. He has been vice president in charge of operations since May 1959.

Officers and directors of Huron, in addition to Mr. Adams, are Paul H. Townsend, chairman of the board; H. Ripley Schemm, president; Clarence L. Laude, vice president in charge of sales, and Earl W. Denby, secretary-treasurer. Colon Brown, vice president in charge of corporate development of National Gypsum Co., was recently elected a director of Huron.

Lewis Rumford II heads Dragon Cement Div.

LEWIS RUMFORD II has been appointed president of the Dragon Cement Co., New York, N.Y., a division of American-Marietta Co. Mr. Rumford, who is president of the Standard Lime & Cement Co. division, succeeds James H. Ackerman, who has retired but will continue as a director of American-Marietta.

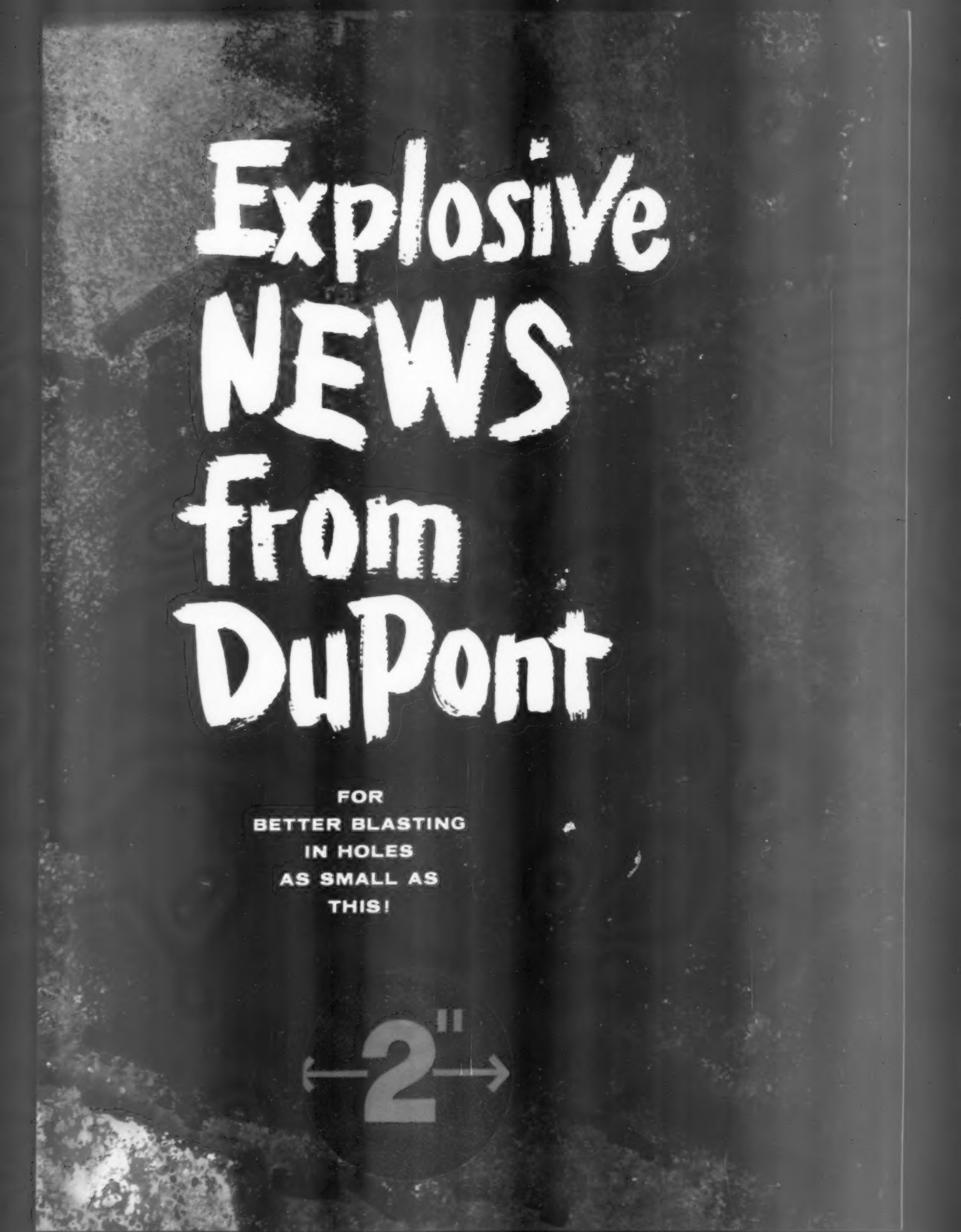
West Sand & Gravel appoints superintendent

JAMES H. THOMAS has been named plant superintendent of the West Sand & Gravel Co., Inc., Richmond, Va. He joined the company in 1957 and has served as an engineer and assistant plant superintendent. A native of Ravenna, Ohio, Mr. Thomas was graduated from Kent State University and holds a BS degree in geology.

Hercules Cement promotes Sobelton and McGonagle

HERBERT G. SOBELTON has been named vice president—administration of Hercules Cement Co., Philadelphia, Pa. John J. McGonagle has been promoted to sales manager.

(Continued on page 37)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From
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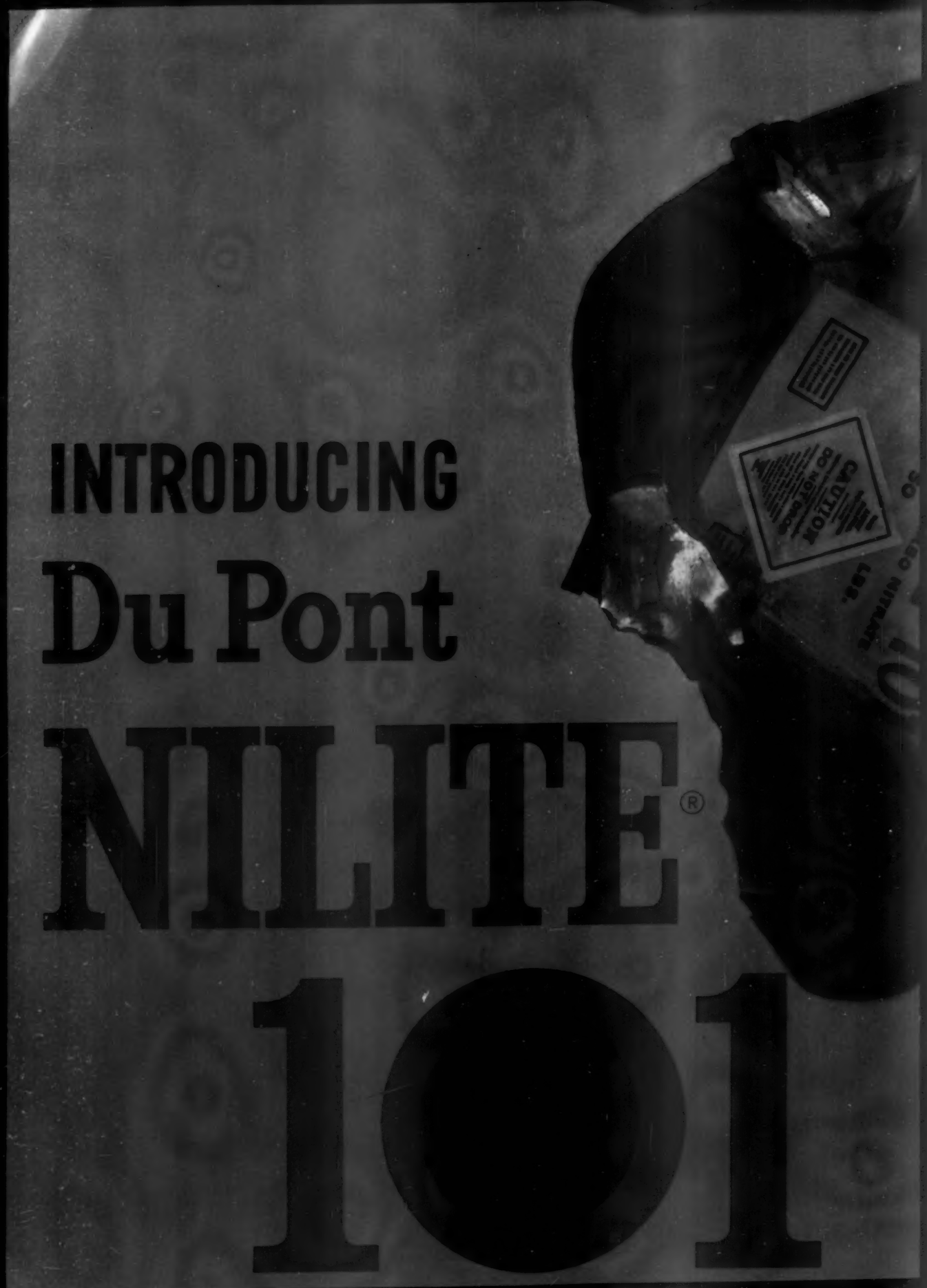
FOR
BETTER BLASTING
IN HOLES
AS SMALL AS
THIS!
2"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101

Flows freely even in holes as small as...

NEW ECONOMY EXPLOSIVE

you don't have to mix

The minute you tear the corner off your first 50-lb. bag of "Nilite" 101, you'll know you've entered a new era in blasting.

Now at last here is a low-priced, free-running explosive that gives you DuPont quality performance, in shot after shot.

You don't mix "Nilite" 101 on the job. You don't mix it at all. Just rip open the bag and pour it into any hole —small, medium, large—from 2″ diameter up. No clogging, no bridging in the hole.

No clouds of dust, and no ingredient to cause headaches. Ask the men on the blasting crew how they'd like that.

But easy loading is just the first of many improvements you'll find in "Nilite" 101.

It has a rock-breaking wallop you've learned not to look for in "economy" explosives. In fact, you'll get performance equal to that of 60% extra dynamite.

What else?

We've counted 12 ways you'll save time, save money and move more rock per day.

They're on the next page...

1. LOW COST The low price of "Nilite" 101, plus the low labor costs (no mixing on the job, no caked and hard-to-pour bags), add up to real blasting economy.

2. NO MIXING No oil to buy or store. No costly or potentially hazardous mixing on the job. Just tear open a bag of "Nilite" 101, and pour it into the hole.

3. NO LOST STRENGTH Because there's no on-the-job mixing, you don't risk losing strength through ineffective blending which can decrease an explosive's potential strength by 30% or more.

4. NO CAKING The particles of "Nilite" 101 are designed to resist setting and caking, even in storage. It stays free-flowing longer than other bulk explosives not so designed.

5. EASY LOADING Pours freely into holes as small as 2" in diameter. Fills the entire cross-section of the hole.

6. NON DUSTING Even when loading on windy days, there is no dust problem with "Nilite" 101.

You owe it to yourself to investigate AND PROFIT BY the advantages now possible only with the new

DU PONT "NILITE" 101

7. NO HEADACHES "Nilite" 101 will not cause headaches among your blasting crew.

8. EASY PRIMING "Nilite" 101 performs reliably when primed with small dynamite or high detonation pressure primers.

9. EXCELLENT BREAKAGE "Nilite" 101 consistently outperforms field mixed blasting agents in producing desired fragmentation.

10. BETTER PROPAGATION "Nilite" 101 is considerably more sensitive to propagation than prill/oil mixtures.

11. GREATER SAFETY "Nilite" 101 is a true nitro-carbo-nitrate (NCN) blasting agent as defined by the Interstate Commerce Commission, and as such is vastly safer to use than any type of dynamite.

12. REPRODUCIBLE RESULTS From shot to shot, you can get dependable results with "Nilite" 101—manufactured under the quality control standards that have established Du Pont explosives as performance leaders in all types of blasting.

UNTIL *YOU* tear open a bag of "Nilite" 101, you'll never know whether you are paying more than you should for each blast.

For a demonstration or a detailed description of Du Pont "Nilite" 101, call your Du Pont Explosives representative or distributor, or send the coupon.

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NAME .....

COMPANY ..... TITLE .....

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(Continued from page 32)

Lake Asbestos sales manager

E. L. RIMBAULT, Jr., has been appointed sales manager of Lake Asbestos of Quebec, Ltd., wholly owned subsidiary of American Smelting & Refining Co. Mr. Rimbault has served as assistant sales manager since July of 1959 and replaces William R. Whitener who has resigned. Born in New York City, Mr. Rimbault is a graduate of Princeton University where he received a degree in chemical engineering.

BRI appoints new officers

GRAHAM J. MORGAN, president, United States Gypsum Co., Chicago, Ill., has been elected vice president of the Building Research Institute of the National Academy of Sciences, Washington, D. C. Jack E. Gaston, general manager of building materials research, Armstrong Cork Co., Lancaster, Pa., has been appointed by the National Academy of Sciences, National Research Council, to serve a 3-year term on the BRI board of governors. He has also been named chairman of the BRI Programs Committee.

Michigan Limestone names quarry superintendent

RAYMOND A. GRIGG has been appointed quarry superintendent at the Calcite, Mich., plant of Michigan Limestone Div. of U. S. Steel Corp. He was formerly assistant quarry superintendent and succeeds Walter F. Meyer who has retired after 36 years of service with the company.

Mr. Grigg joined the Calcite plant in 1939 and has been assistant quarry superintendent since 1958.

ASTM elects new executive secretary

THOMAS A. MARSHALL, JR., has been elected executive secretary of the American Society for Testing Materials, according to an announcement bv Dr. A. Allan Bates, president of ASTM. A native of Savannah, Ga., Mr. Marshall was graduated from Georgia Institute of Technology with a BS degree in aeronautical engineering. He is currently assistant secretary of the American Society of Mechanical Engineers.

Fred F. Van Atta, who has been assistant secretary since joining ASTM in 1953, was elected treasurer. Previously he was assistant secretary of the American Concrete Institute and later acting secretary-treasurer. A native of Michigan, Mr. Van Atta was graduated from Michigan State University with a BS degree in civil engineering.

Robert J. Painter, formerly executive secretary and treasurer, will continue as consultant to the executive secretary, and Raymond E. Hess, who has been a member of ASTM since 1920, will continue as associate executive secretary, technical secretary and editor-in-chief.

Russell Hunt receives award

RUSSELL W. HUNT, president of Southwest Lime Co., Neosho, Mo., was recently honored by the Missouri School of Mines at Rolla, Mo., in recognition of his accomplishments in the field of engineering. Mr. Hunt, who has had wide experience in mining and construction, is a former president of the Missouri Limestone Producers Association and past chairman of the board of the National Limestone Institute. He is also a member of the board of C. F. Bowers Construction Company.

Boyce Martin becomes C. of C. president

BOYCE F. MARTIN, president of Louisville Cement Co., Louisville, Ky., has been named 1961 president of the Louisville Chamber of Commerce. Mr. Martin, who has been serving as vice president for the past year, is also chairman of the legislative committee.

Riverside names Fontius director of manufacturing

CHARLES H. FONTIUS, who has been assistant to the president of Riverside Cement Co., Los Angeles, Calif., since July 1959, has been appointed director of manufacturing and will be responsible for production and purchasing activities. Prior to joining Riverside Mr. Fontius was secretary-treasurer and a director of Narmco Industries, Costa Mesa, Calif.

Lewis and Allgood promoted by Kaiser Gypsum Co.

JOHN O. LEWIS has been named superintendent of the Seattle, Wash., gypsum products plant of Kaiser Gypsum Co., Oakland, Calif. A native of Georgia and a graduate of the Georgia Institute of Technology, Mr. Lewis was formerly superintendent of the Antioch, Calif., plant and will be succeeded by Robert Allgood who formerly was superintendent at the Seattle plant. Mr. Allgood is a native of Missouri and a graduate of Merritt Business College in Oakland.

Farrell and Foster elected Ocean Cement executives

GORDON FARRELL has been elected chairman of the board of Ocean Cement & Supplies, Ltd., Vancouver, B.C., and William F. Foster has been named president. They were also elected to the same positions in the subsidiary companies of British Columbia Cement Co. Ltd.; Evans, Coleman & Gilley Brothers Ltd., and Evans, Coleman & Evans Ltd.

OBITUARIES

Coleman F. Nugent, founder and former president of the Nugent Sand Co., Muskegon, Mich., died September 11. He was 70 years of age. Mr. Nugent, who founded the company in 1912, was active in its affairs until 1947, when he sold the business and retired.

William V. Lechleiter, sales manager for Nugent Sand Co., Louisville, Ky., died September 9, age 70.

Marion R. Ghiselin, owner of the Cache Creek Sand & Gravel Co., Clear Lake Oaks, Calif., was killed September 16 when struck by a car as he walked along a highway near Clear Lake Oaks. He was 63 years old.

L. A. Kuenzli, president of Kuenzli Quarries Co., Inc., Upper Sandusky, Ohio, passed away September 21. He was an active member of the Ohio Sand and Gravel Association and regularly attended its meetings.

John H. McKernan, superintendent of the Wallingford, Conn., plant of the New Haven Trap Rock Co., New Haven, Conn., died August 31 at his home in Wallingford. He was 61 years old. Mr. McKernan, who joined the company 45 years ago, had been superintendent of the plant since 1946. Prior to that he was assistant superintendent of the North Branford plant.

END

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For in aggregate and sand production . . . *as in all of the great ore and industrial minerals operations the world over* . . . no record equals the performance of Symons Cone Crushers that have so consistently produced, economically and efficiently, great quantities of finely crushed product resulting in higher profit per ton per hour.

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SYMONS . . . a registered Nordberg trademark known throughout the world

FOR STATIONARY PLANTS

Symons Cone Crushers, in Standard and Short Head types, are the choice of leading contractors and producers for primary, secondary and finer reductions in all types of aggregate operations. Available in sizes from 22" to 7' in diameter, for capacities from 6 to 900 or more tons per hour.

FOR PORTABLE PLANTS

Symons Cone Crushers are being used in increasing numbers for portable and semi-portable crushing plants. View shows part of a Cedarapids portable crushing and screening plant, utilizing a Symons Cone Crusher. Unit is serving a large Texas aggregate producer.

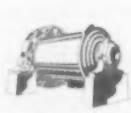
C-160

ILLINOIS TOLLWAY

(ABOVE:) Tri-level interchange of Northwest and Tri-State Tollways near Chicago's O'Hare International Airport.

(RIGHT:) View of the modern Northwest Tollway bridge crossing the Fox River near Elgin, Illinois.

SYMONS PRIMARY GYRATORY CRUSHERS

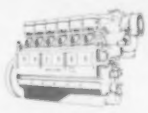


NORDBERG GRINDING MILLS

SYMONS VIBRATING GRIZZLIES

SYMONS VIBRATING SCREENS

ROTARY KILNS AND DRYERS



NORDBERG ENGINES

NORDBERG MANUFACTURING COMPANY · Milwaukee 1, Wisconsin

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY • MINNEAPOLIS • NEW ORLEANS • NEW YORK • ST. LOUIS
SAN FRANCISCO • TAMPA • WASHINGTON • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D.F.

SYMONS SCREENS NORDBERG

© 1960, N.M.CO.

Pioneer soil-cement highway attains silver anniversary

1960

1935

SOIL-CEMENT had been the subject of research for 15 yr. when the South Carolina Highway Department opened a 1½-mile strip of route 41, near Johnsonville, to the public. This was the first scientifically controlled road constructed of soil cement; yet its debut caused no stir outside of engineering circles. Actually, less than 100 vehicles a day used the highway.

Today, its 25th anniversary is something to note. The traffic pounding over its surface averages 2,000 vehicles daily. Paradoxically, the soil-cement base has gained in strength over the years.

Despite its modest beginning, the Johnsonville installation marked a major break-through in highway-construction techniques. The ready availability of soil that constitutes 85 to 90 percent of the finished base prompted the U. S. Army Corps of Engineers to adapt it to their defense installations.

One of the first military uses of soil-cement dates back to World War II. A soil-cement road constructed by the Chinese government at that time still follows the arduous turnings of an ancient caravan trail between Sian and Lanchow. Doubtless, it will continue to survive its rugged environment as sturdily as the Johnsonville strip—shown before and after 25 yr. of traffic in the scenes above.

More than 24,000 miles of soil-cement paving now underlie the surfaces of highways in the United States and Canada. Highway engineers are said to be giving greater consideration to this technique as the ideal paving of the future. Corroborating their opinions are the results of tests for durability and moisture-density, encompassing cycles of freezing and thawing and wetting and drying.

Construction starts on Calaveras plant

A LUNCHEON FOR OFFICIALS of the Calaveras Cement Co. was given in September by the Redding, Calif., Chamber of Commerce. It marked the kick-off for construction of the company's new $14-million plant north of the city.

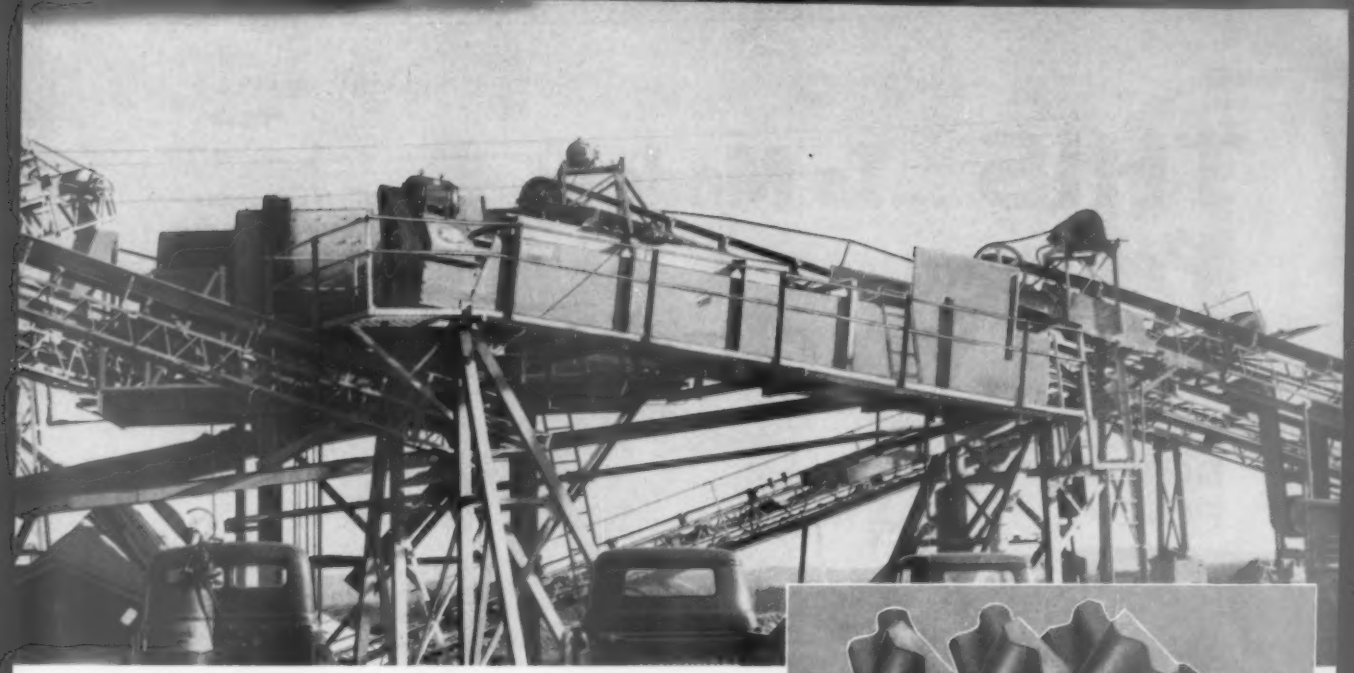
William Wallace Mein, Jr., Calaveras president, told the civic leaders that the site held over 60-million tons of 92-percent pure limestone, a large quantity of high-grade shale, a gently sloping terrain between a mainline railroad and a super highway, and ready access to low-cost fuel. Mr. Mein called this a "once-in-a-lifetime" combination.

The plant, Mein said, would incorporate the latest technological ideas for increasing automation. An operation using 80 to 100 men would be kept going weekends with a crew of only five.

Contracts were awarded to three San Francisco firms: one for construction of the main plant, another for building the shop and warehouse and a third for silos and packhouse.

Shipments of cement to customers in southern Oregon and northern California are expected to start in September 1961.

(Continued on page 42)



"Our EAGLE LOG WASHER is taking out the plastic clay and doing a great job!"

MASON-DIXON SAND & GRAVEL CO. OF PENNSYLVANIA, PERRYVILLE, MD.

For washing rock or crushed stone the Eagle Double Log Washer has no equal. Material is immersed for sufficient time so that the corrugated paddles can abrade and scrub every piece of material. Plastic clay balls and soft stone are broken up or worn away and washed out by the water currents rising from the bottom of the washer tub. Cemented aggregates and conglomerates are loosened up. Material is freed of water as it is conveyed up the drainboard to the discharge opening.

Mason-Dixon Sand & Gravel Co. of Pa., uses an Eagle Double Log Washer with 36" dia. logs in a 30' tub length. Material fed to it is ½" to 2½".

Send a sample of your material for a free test run and report from Eagle's engineers and laboratory technicians—ask for shipping instructions. Also ask for Catalog 58.

SINCE 1872

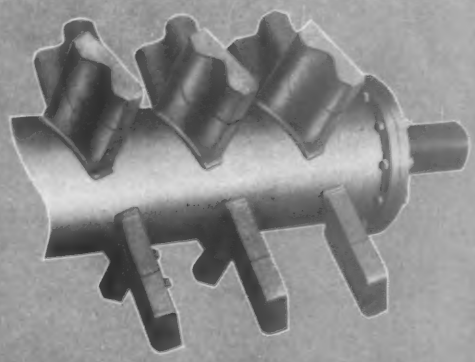
EIW EAGLE IRON WORKS

EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

137 HOLCOMB AVE., DES MOINES, IOWA

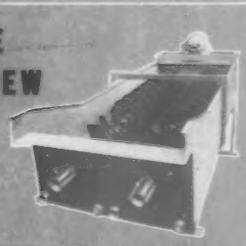
FACTORY-TRAINED DISTRIBUTORS EVERYWHERE



"Way ahead design" includes two-piece paddle shoes

Indicative of Eagle's superior engineering and advanced design are the two-piece Ni-Hard wear resistant alloy shoes, which are bolted to the paddles welded on the log shaft. Top half of shoe, which receives brunt of wear, can be replaced without disturbing bottom half. Totally enclosed compound gear drive in oil bath is another maintenance cost cutting feature.

EAGLE COARSE MATERIAL SCREW WASHER-DEWATERERS

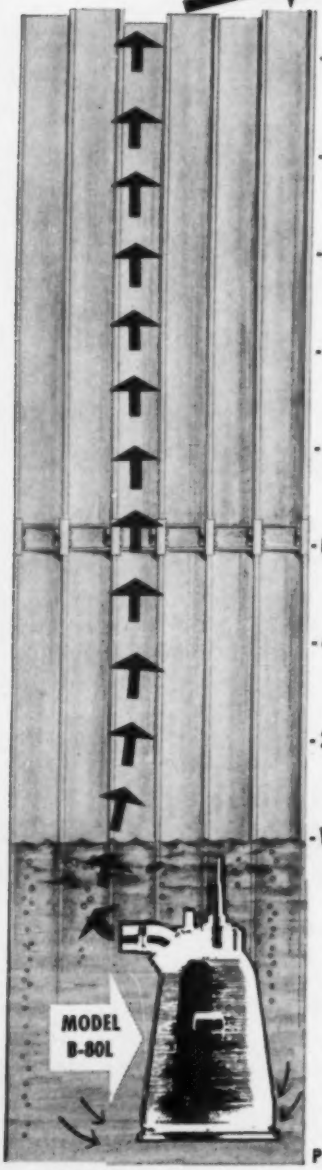


Single and double screw units. For processing coarse material. Scrubs every particle, loosening and washing out silt, clay and other foreign matter. Special models with Trash Removers for removal of chips, coal, vegetation and other buoyant material. Also auxiliary Shale Removers.

THIS ...Is Modern Performance by FLYGT!

ELECTRIC SUBMERSIBLE PUMPS

170 FOOT HEAD • HIGHER IN TANDEM



One drainage job. One 3" Flygt pump. Put them together and you've got action — 340 GPM at discharge; heads to 170 feet or higher in tandem. This is typical performance from Flygt — the only pump that can cut your pumping costs — handle your drainage and dewatering jobs in less time. All other models in the Flygt line, ranging in discharge sizes from 1½" to 8", and capacities to 3100 GPM with heads to 220 ft., give comparable excellent performances. Flygt electric submersible pumps are solving difficult water problems on thousands of jobs all over the world. Fully portable, they go right in the water — start pumping immediately, giving day and night performance without supervision and only occasional inspection. Rugged, simple, fool-proof, economical — Flygt pumps are the modern approach to drainage and dewatering. Get to know Flygt by writing for illustrated brochure, then ask your local distributor for an on-the-job demonstration.

FLYGT Corporation

HOOSICK FALLS, N. Y.

WESTERN SALES & SERVICE: STANCO MFGS. & SALES INC., 1666 Ninth St. (Corner of Olympic) Santa Monica, Calif.

PUMP BETTER ELECTRICALLY—USE FLYGT!

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INDUSTRY NEWS

(Continued from page 40)

Alpha offers customers weather forecast service

ALPHA PORTLAND CEMENT CO. is providing its customers with a weather forecasting service with more detailed information than is available from the U. S. Weather Bureau. Its purpose is to help cement users—ready mix and concrete products producers and contractors—plan their work a month ahead.

The first issue of "The Alpha Weathervane" appeared in August. The information in the monthly reports is supplied by Weather Trends, Inc., New York, a private firm of meteorologists specializing in long-range forecasting.

Sand screening, settling booklets are available

TWO BOOKLETS on sand preparation that were originally published as a service to ROCK PRODUCTS readers are still available and may be had by writing this magazine. Nathan C. Rockwood's "Screening Fine Materials," copyrighted in 1946, is an authoritative discussion of determining factors in the operating efficiency of vibrating screens.

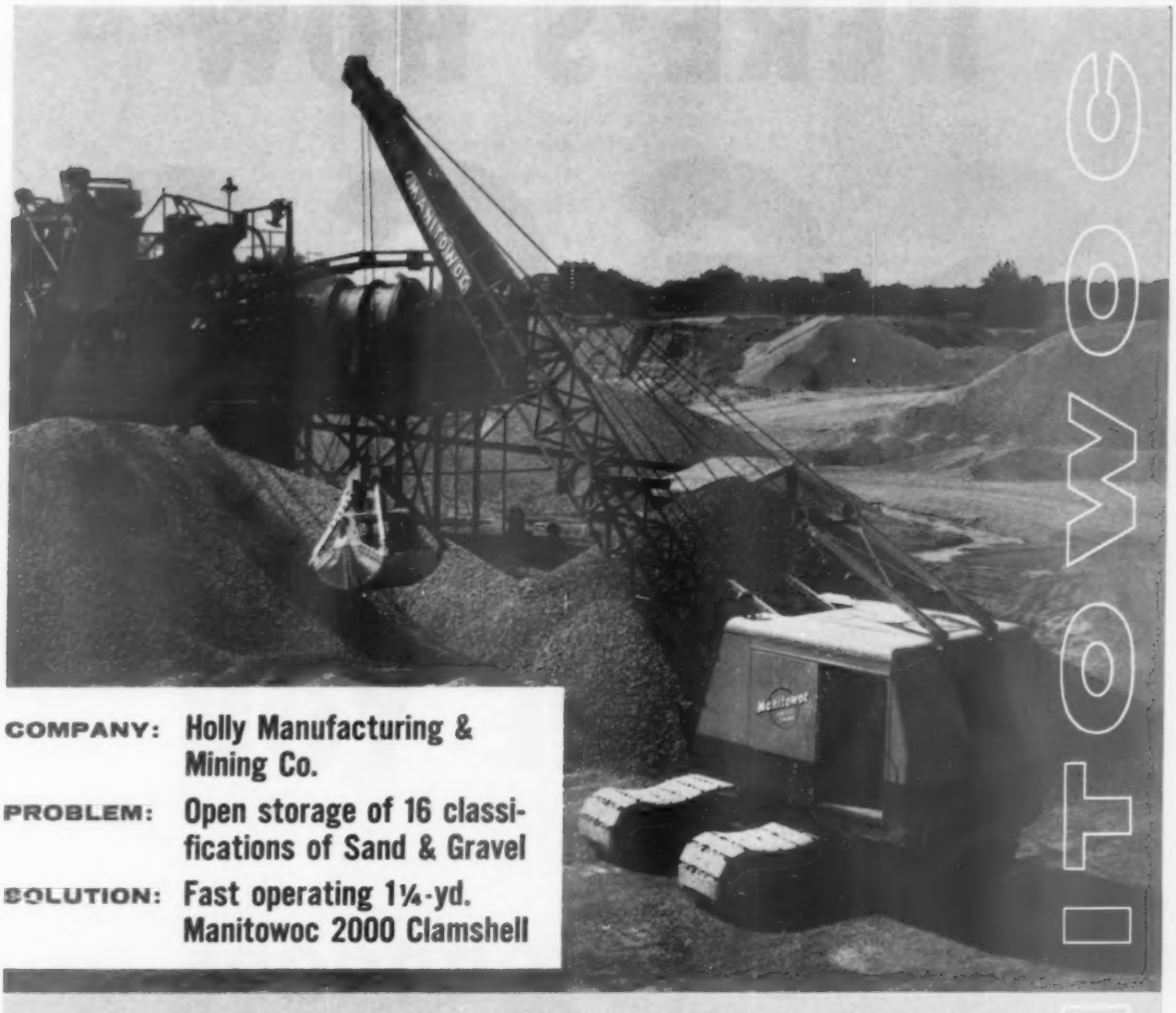
Another volume, "Fundamental Principles of Sand Settling," (copyright 1929 and 1943) was written by the late Edmund Shaw as a practical guide to commercial sand producers. A limited number of these standard references still on hand will be given to individuals requesting them.

Big-10 merger in Southern California

RODEFFER INDUSTRIES, INC., is a new enterprise in San Gabriel, Calif., that mushroomed from one small ready mix plant started in 1946 by E. O. Rodeffer. As president of the expanded firm, he announced that 9 other companies had joined his business in a 10-plant merger. "We now have the largest independent corporation operating in the rock, sand and ready-mix concrete industry in Southern California," he said.

The merger included 7 San Gabriel ready mix companies, the Century Rock Co. in the San Gabriel River Deposits, Star Rock Products, Inc., in Santa Anita Canyon and Admixtures, Inc., of Pasadena.

(Continued on page 48)



COMPANY: Holly Manufacturing & Mining Co.

PROBLEM: Open storage of 16 classifications of Sand & Gravel

SOLUTION: Fast operating 1¼-yd. Manitowoc 2000 Clamshell

MANITOWOC

Sixteen classified products, ranging from fine asphalt sands up to 2½-in. diameter State Highway Dept. 4-A stone, are produced at the Holly Manufacturing & Mining Co. plant near Davisburg, Michigan. Operating 24 hours a day, the plant produces stone alone at a rate of 150 tons each hour. It takes a fast, smooth operating machine to stockpile this volume *plus* the company's other products as well. Yet, the Manitowoc is handling all open storage and, in addition, assists two tractor shovels in loading trucks at times.

The Manitowoc Model 2000 clamshell has many job-proven features that put stockpiling production way out in front of other like-size machines. Continuous *fast output* is possible because power transmission is direct and simple. With Manitowoc's exclusive "Power-flo" slide pinion only gears that are working turn—non-working gears can't "rob" horsepower from the particular function that's in operation. The powerful Manitowoc drum assembly provides *fast closing and hoisting line speed* with properly matched holding line action. Pinpoint control gives you production benefits because you swing, spot and dump your loads without jockeying.

You get speed — and much more — *when you move materials with Manitowoc* . . . accurate control, exceptional stability, true balance, unmatched mobility. Get all the facts now . . . from your nearby Manitowoc distributor.

Manitowoc

MANITOWOC ENGINEERING CORP.

(A subsidiary of The Manitowoc Company, Inc.)

Manitowoc, Wisconsin

SHOVELS — 1¼ to 6 yds DRAGLINES — 1¼ to 7 yds.

11-G

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HERE'S HOW

SECO SCREENS ASSURE YOU

- ✓ higher tonnages
- ✓ cleaner product
- ✓ less downtime

...and *MORE* PROFIT!

ENGINEERING SUPERIORITY

Maximum efficiency of the SECO Screen starts at the engineering drawing board. Here's where rigid specifications are established to give every SECO Screen long-life dependability even under the toughest job conditions. Down-time in your operation is virtually eliminated because an extra margin of safety is designed into every SECO Screen.

MANUFACTURING SUPERIORITY

Every part of the SECO Screen, except bearings and wire cloth, is designed and built in the modern SECO plant to control and maintain the highest degree of quality. Tolerances of up to one-half thousandth of an inch give SECO Screens the operating precision of a fine watch movement that assures smooth, accurate production even at peak load capacity.

Careful inspection takes place at every step of manufacture and the completed screen is put through a final test run where every moving part is checked for perfect fit and perfect balance by screen experts.

25 YEARS OF FIELD EXPERIENCE

SECO makes vibrating screens exclusively in standard or special sizes and models to handle any specific screening job. Years of knowledge, gained from working with producers all over the country, are built into every SECO Screen to make it the most profitable equipment you can own.

GET THE FACTS NOW!

Send TODAY for NEW 4-BEARING CATALOG 205

A full 12 pages of valuable vibrating screen information concerning engineering features, installation methods, special attachments and a special guide to screen selection. It's new and informative...send for your copy today!

A personal invitation . . .

SECO extends a personal invitation to visit their modern plant and see for yourself all that goes into the manufacture of the most dependable vibrating screens on the market. Next time you're in the Buffalo area, make it a point to stop in at the SECO Plant, 40 Anderson Rd.

SCREEN EQUIPMENT COMPANY, INC.
BUFFALO 25, NEW YORK

SECO

"TIME CONSCIOUS" VIBRATING SCREENS

If you use rear-dump haulers

Backed by better than 25 years of specialized experience in building off-highway earthmoving equipment exclusively, Euclid's modern rear-dump line incorporates advanced engineering that is a result of unmatched field experience. From the 10-ton Model R-10 to the big 55-ton "Euc" with two engines and a total of 672 h.p., Euclid Rear-Dumps are job proved to meet today's requirements for big performance. This greater dimension... in range of capacities, in choice of engines, transmissions and tire sizes, and in type of hauler... and in parts and service facilities of a world-wide dealer organization, too... can mean lower hauling costs and more work-ability on every one of your rear-dump jobs.

Have the Euclid dealer in your area give you facts and figures to compare with your own hauling costs... you'll find Euclid's greater dimension pays off in a better return on your investment. EUCLID Division of General Motors • Cleveland 17, Ohio

Payload capacities of 10, 15, 18, 22, 27, 40 and 55 tons... also semi-trailer models of 12, 22, 35 and 50 ton capacity.

When you compare Rear-Dump Haulers, check these 7 points...

- is maker experienced in the field... known for building a dependable, well-engineered product?
- does machine have required performance ability needed... capacity and speed for high production work, power and traction for rough going and steep grades?
- well-balanced for size of loading equipment... hoppers and controlled dumping needs?
- is there good parts and service availability... at both manufacturer and dealer level?
- are maintenance manuals, parts books and service literature complete... is machine designed for easy servicing?
- is machine easy to operate... convenient controls... good visibility... operator comfortable so that efficiency is maintained for entire shift?
- can required production be maintained at low cost... construction rugged enough to withstand heavy service with minimum maintenance?

Euclid Rear-Dumps meet every one of these important requirements... and more!

BIG POWER . . . BIG CAPACITY . . . BIG PERFORMANCE

Model R-27 has heaped capacity of 26½ yds. . . . rated payload is 54,000 lbs. . . . available with Cummins 335 h.p. or GM 336 h.p. engine . . . 4-speed Torqmatic Drive with converter lock-up and Torqmatic Brake . . . dual hydraulic booster steering . . . 18.00 x 25 tires on all wheels . . . rugged body with twin hoists . . . top speed with full payload, 34 mph. . . . available in two body types, standard for all-around use and quarry for hauling big rock.

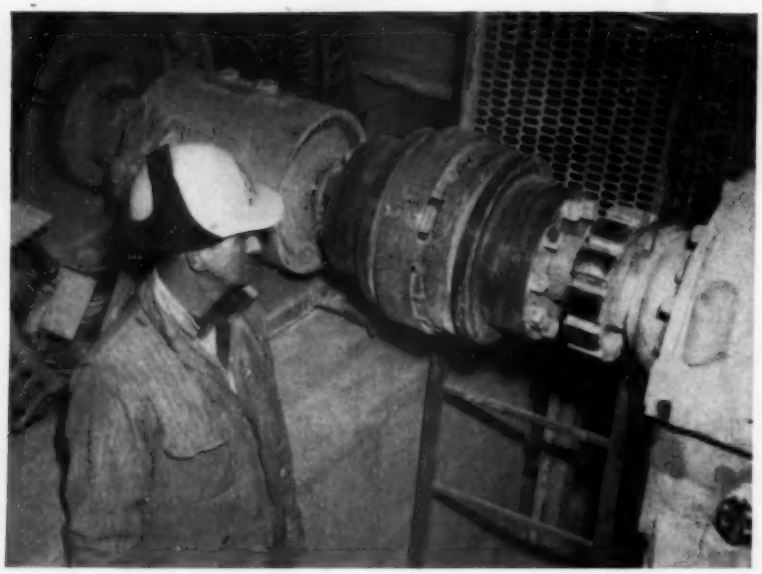
ENGINEERED FOR EASY SERVICING

Like other Euclids, the R-27 is of simple, rugged design for years of dependable performance at minimum maintenance cost. When repair or replacement of major components is necessary, service-minded engineering saves time and money, too. For example, a transmission can be removed and replaced in just one-eighth the time required for the same work on a competitive hauler of the same capacity . . . engine replacement takes only one-half as many man-hours.

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

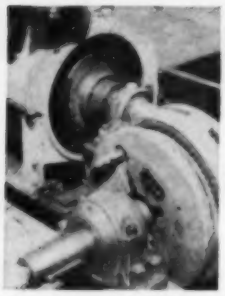


"Needed A Big Coupling To Lick A Tough Job–Got It With A Lovejoy"

And it's been going steadily for over 1½ years, 16 to 20 hours per day—driving between a 350-hp., 400-rpm. synchronous motor and a preliminary crusher on which 5 other makes of couplings broke down within 6 months. Maintenance during that period amounted to one dusting, solely for the purpose of the above photograph.

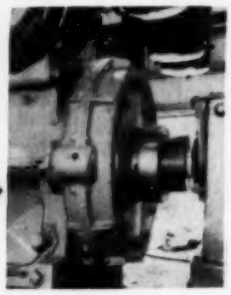
These facts come from a large midwest cement company where clinkers hard enough to cut glass are ground. Other conditions are dust and abrasion, .065 parallel and 2° angular misalignment.

On this and other heavy duty applications, Lovejoy Couplings are saving initial costs, eliminating maintenance and lasting longer. For instance:



Lovejoy CF 280 mounts directly to flywheel of engine to provide compact drive connection to gear box on giant crawler crane.

Lovejoy CF 400 provides direct drive from a 12-cylinder, 400-hp. diesel to a 4-cylinder double compressor.



Remember, too, that Lovejoy Flexible Couplings require only a straight edge to quickly and properly align.

Get the facts. Give us your requirements, and we'll recommend the right coupling—fractional to over 4000 hp. Request Catalog C-58.

LOVEJOY FLEXIBLE COUPLING CO.

4822 WEST LAKE STREET **CHICAGO 44, ILLINOIS**

Enter 1064 on Reader Card

INDUSTRY NEWS

(Continued from page 42)

West Pakistan plants get two new kilns

PLANS TO INCREASE CEMENT production in factories of the Pakistan Industrial Development Corp. spurred additions of two new kilns. The Maple Leaf Cement Co. at Daudkhel, said a PIDC spokesman, would raise its daily output from 850 to 1,350 tons with a third kiln. The Zeal-Pak Cement Co. at Hyderabad would up its existing daily production from 1,200 to 1,600 tons with the addition of its fourth kiln.

PIDC chairman, Lt.-Gen. Iftikkar Ahmad, expects that expansion of cement plants in Karachi will eventually produce sufficient cement to meet the country's requirements.

A factory now underway at Moghopir, Karachi, will have an annual capacity of 450,000 tons. After local demands are met, it estimates enough surplus will be produced to provide shipments to East Pakistan.

Wyandotte increases lime calcining capacity

WYANDOTTE CHEMICALS CORP., Wyandotte, Mich., is converting its coke-fired lime kilns to gas firing for the production of high-quality lime. The change is being made to increase productive capacity as well as to improve quality.

Upon completion of the program (the first unit is scheduled to be in operation by the beginning of 1961), Wyandotte will have the capability to produce high-grade lime at the rate of 1½ million tpy. These changes are predicted to be sufficient to meet industrial and other needs in the Detroit and Down River areas for the next 10 or 15 years.

New Buildex plant going up in Kansas

A NEW PLANT, expected to produce more than 125,000 cu. yd. of Buildex (haydite) annually, will be erected by Buildex, Inc., near Marquette, Kan. The product is a lightweight expanded shale aggregate, manufactured in a rotary-kiln process. Announcement of the proposed plant was made by Ben F. Park, vice president of Buildex. The company, with headquarters in Ottawa, Kan., is a subsidiary of Mackie-Clemens Coal Co., Pittsburg, Kan.

(Continued on page 52)

"Not yet a dime for repairs!"

Left: Mumphrey dredge in operation, showing Thomas pump discharging against a baffle. Below: Thomas pump installed in Mumphrey dredge.

THOMAS PUMP

GIVES HIM ADVANTAGE OVER HIS COMPETITORS

On the Mississippi River in and around New Orleans, competition is keen in the sand and gravel business. Anthony Mumphrey says his Series JL 10" bottom-discharge Thomas DURABLE Dredge Pump steadily keeps on working month after month, while his competitors frequently are forced to close down in order to make pump repairs.

Mr. Mumphrey believes that it is this added production by his Thomas Pump which enables him *to operate at a profit instead of a loss.* Read his interesting letter at the right.

The Thomas pump is designed especially to permit use of Thomas Ni-Hard alloy in its manufacture and give increased efficiency in operation. Result: Installations all over the U.S. show performance records like Mr. Mumphrey's. Write for additional facts.

Thomas DURABLE Dredge pumps are manufactured in range of sizes from 6" to 16" discharge.

MUMPHREY & COMPANY
85 LYNDEL DRIVE
CHALMETTE, LOUISIANA

August 4, 1960

Thomas Foundries, Inc.
Birmingham, Alabama

Gentlemen:

Competition is plenty tough on the Mississippi River in and around New Orleans. There are a number of us doing dredging work so prices per cubic yard are extremely low.

The only real advantage I have is my 10" Thomas Pump. While some of my competitors are working on their pumps making adjustments and repairs, I am still producing and moving material.

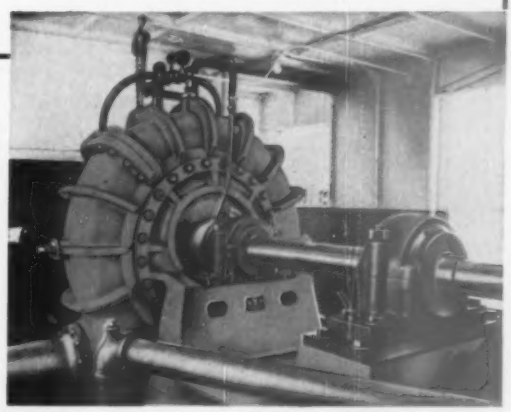
On parallel dredging jobs I'm able to finish ahead of my competitors. I believe this added production from my Thomas Pump is the difference between profit and loss.

Yours truly,

Anthony Mumphrey

Anthony Mumphrey

P. S. The Thomas Pump was delivered to me about eleven months ago. I haven't yet spent a dime on it for repairs.



THOMAS FOUNDRIES Inc.

P. O. BOX 1111, BIRMINGHAM, ALABAMA

Enter 1002 on Reader Card

"Jeffrey equipment is excellent...in use throughout our operations to make a fine product"

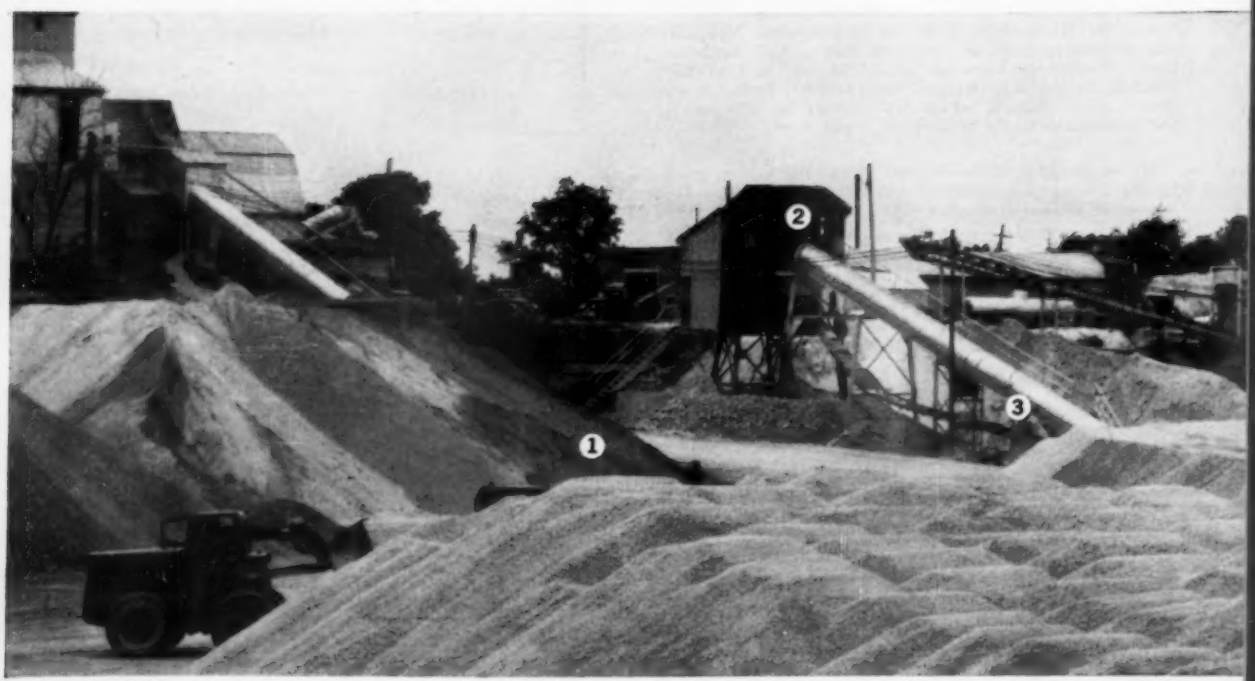
...George E. Karch, *President, Karch Stone Company, Celina, Ohio*

This modernized quarry operation has stepped up production using Jeffrey equipment in virtually all operations, from crushing heavy stone to feeding and conveying, to delivery of finished sized stone and agricultural limestone. The Company reports that operation and performance of the Jeffrey equipment has been very dependable, helping to produce high quality products.

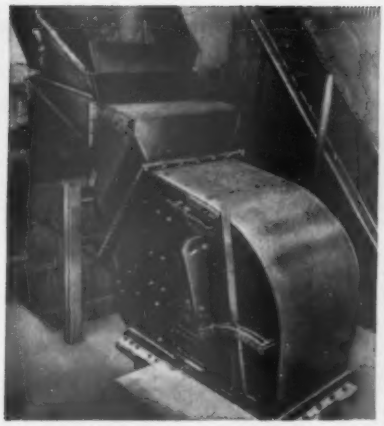
Jeffrey serves every basic industry with *mechanization*... conveying and processing equipment, transmission and mining machinery. Sales-engineering service worldwide; standard products stocked by authorized distributors.

Use Jeffrey's broad line of experience to get greatest efficiency in your heavy industrial plants. The Jeffrey Manufacturing Company, 935 North Fourth St., Columbus 16, Ohio.

JEFFREY



1. Jeffrey electric vibrating feeder delivers incoming stone to crusher.



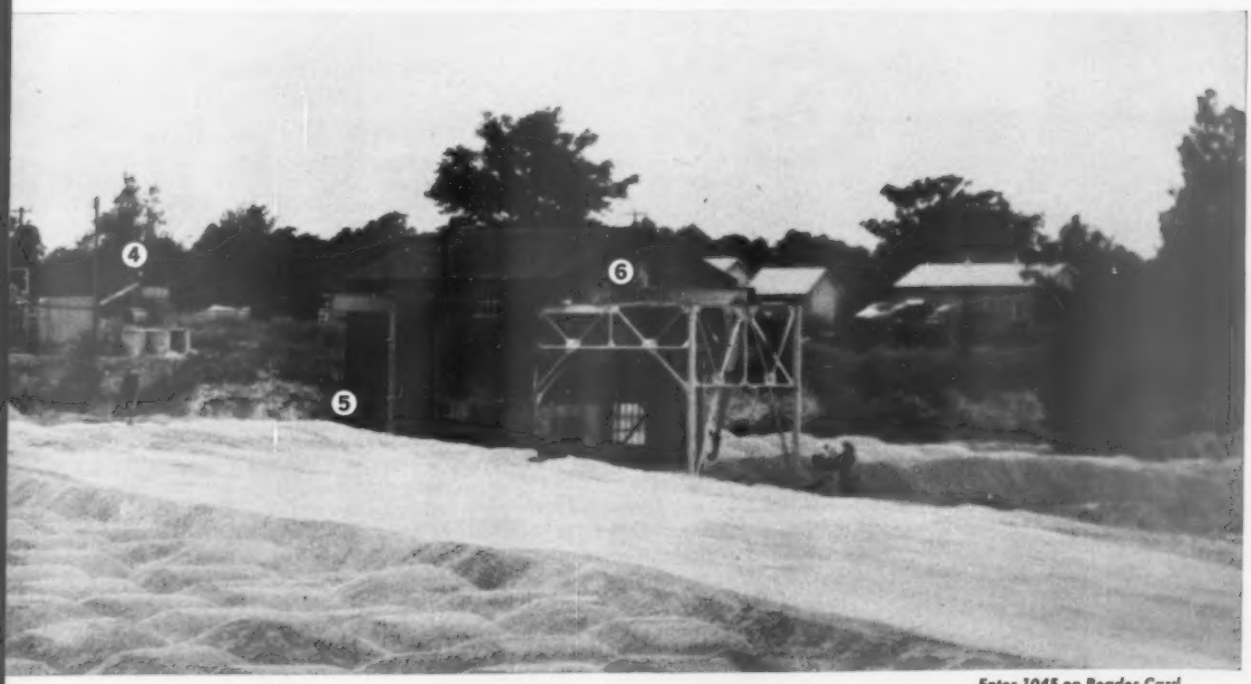
2. Jeffrey Rockbuster reduces material to minus 3 inch size.

3. Jeffrey belt conveyor handles crusher product.

4. Mud Hog and conveyor idlers.

5. Jeffrey feeder.

6. Jeffrey feeder.



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(Continued from page 48)

Consolidated takes 2nd top safety trophy in row

CONSOLIDATED ROCK PRODUCTS CO., Los Angeles, Calif., boasts an enviable safety record. Its Irwindale plant received its second Class A safety trophy, repeating a performance of last year. The competition was limited to plants producing 500,000 tons of material or more per year by National Sand and Gravel Association.

Admiring the trophy, provided by ROCK PRODUCTS, are, from left: Q. W. Best, Consolidated's executive vice president; Walter Good, operations manager; Robert Fitzgerald, Irwindale plant superintendent; Jack Ayles, assistant operations manager, production; Walter Sherbourne, safety engineer, and Francis L. Kirk, assistant superintendent at Irwindale.

Two other Consolidated plants—Hewitt and Claremont—received Certificates of Safety from National Safety Council for 5 years without lost-time accidents.

American-Marietta net sets nine-month peak

WHEN AMERICAN-MARIETTA CO. revealed record sales and earnings for the third quarter of 1960, it confirmed reports of an unbroken rise to August 31 for the nine-month period. Sales for the fiscal third quarter reached $107.1 million in comparison to $92.1 million for the same period last year. Net income, in excess of 8 percent of sales for the three months, was 9 percent of sales for the final month. The total income of $8.7 million for the period was 12 percent above the $7.8 million of last year's third quarter.

Total sales of $26.8 million computed for the first nine months of 1960 were 14 percent above the $234.9 million for this span in 1959. The increase in net income went from $17.2 million to $17.9 million.

On a per share basis, net income and cash flow equaled $1.32 and $2.26 respectively with 13-million common shares outstanding. In the same period last year, net income was $1.46 and cash flow $2.19 per share on 11.3 million in common stock. The greater number of shares outstanding represented stock issues to acquire other companies which did not contribute for the full nine months.

Taxes for the nine months were increased by approximately 5¢ per common share under provisions of legislation enacted in September covering the computing of percentage depletion in cement operations on a kiln feed-off basis.

Grover M. Herman, chairman of the board, announced that the directors had declared a regular quarterly dividend of 25¢ on common shares and $1.25 on preferred. Both dividends were payable on Nov. 1 to shareholders of record on Oct. 20, 1960.

Mr. Herman attributed the company's increases to greater operating efficiency. He said that deliveries of its diversified products are continuing at the level reached in August.

Housing drop affects U. S. Gypsum profits

CHIEF CAUSE OF A DECLINE in U. S. Gypsum profits in 1960 is laid at the door of the housing falloff. C. H. Shaver, chairman of the company, said that so far as he could see "easier money hasn't translated itself as yet into any particular pickup in housing."

In expressing this view, he added that Gypsum's net drop would be "roughly" 15 percent from the record $46.3 million that earned $5.07 a common share in 1959.

U. S. Gypsum sales are expected to slip 5 to 6 percent from the record 1959 volume of $301 million. Profits in the first half of the year dropped 19 percent to $18.6 million—or $2.29 a share—on sales of $113 million that represented an 8-percent decline.

Bright spot on Mr. Shaver's horizon is the good level of demand for repair and remodeling materials. He said that U. S. Gypsum will stick to its planned 1960 capital spending of about $36 million.

New group forms in southern Michigan

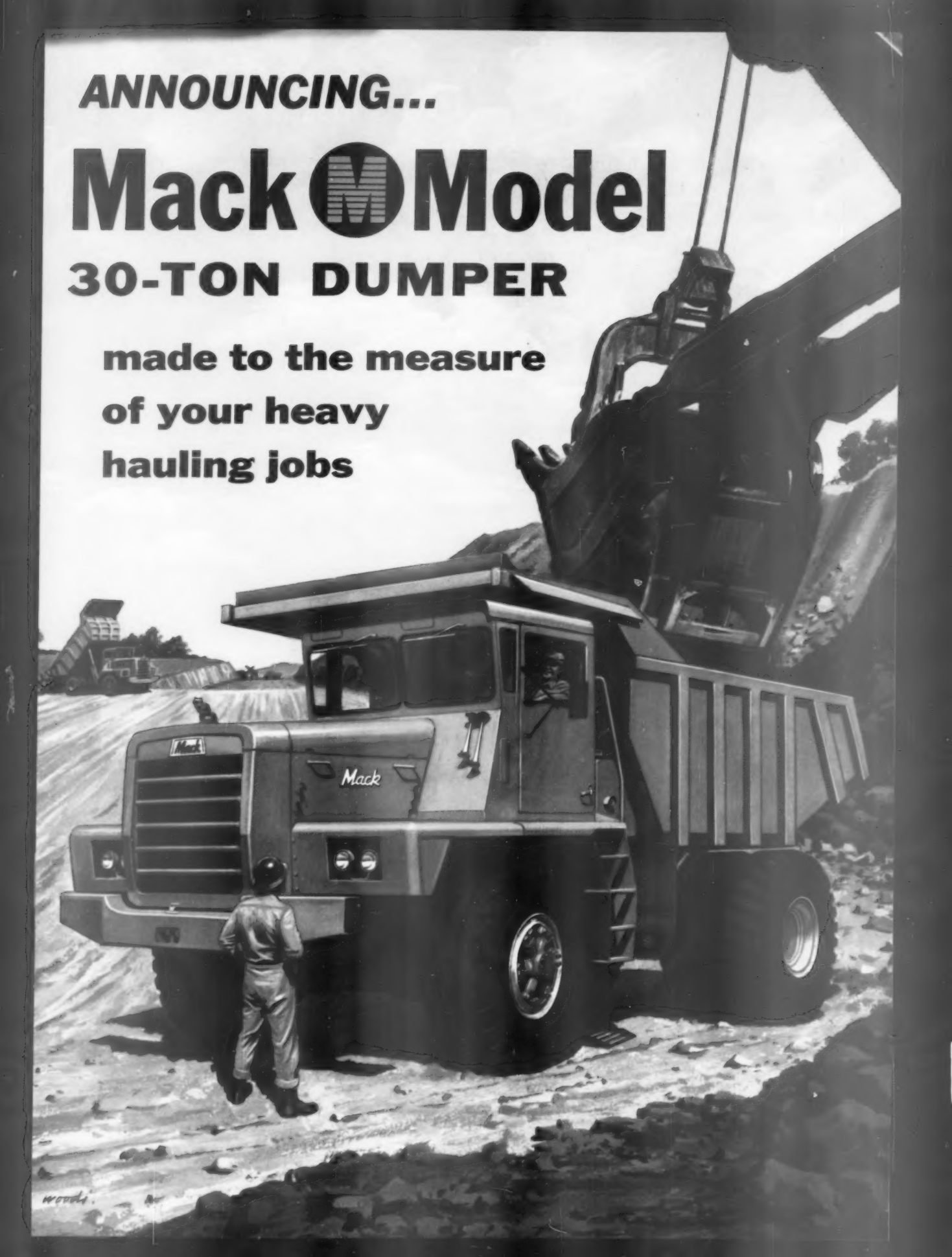
TWENTY COMPANIES located in southern Michigan have organized the Michigan Sand & Gravel Producers Assn. Headquarters are at 1305 Industrial Bldg., Grand and Washington Blvd., Detroit 26.

Newly elected President Lyle J. Walker announced the aims of the association: "We plan to promote greater understanding and cooperation between sand and gravel users and the industry," he said.

Specifically, the new group will help to establish and maintain standards for aggregate materials used in concrete and bituminous construction. It expects to work with state and local governments for sound legislature that will enable the industry to operate in the best interests of the public.

Lloyd B. Reid, former Michigan State Highway Commissioner, has been appointed executive director.

(Continued on page 57)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30-TON DUMPER
made to the measure
of your heavy
hauling jobs
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30-TON DUMPER

with the components to make your hauling jobs more profitable

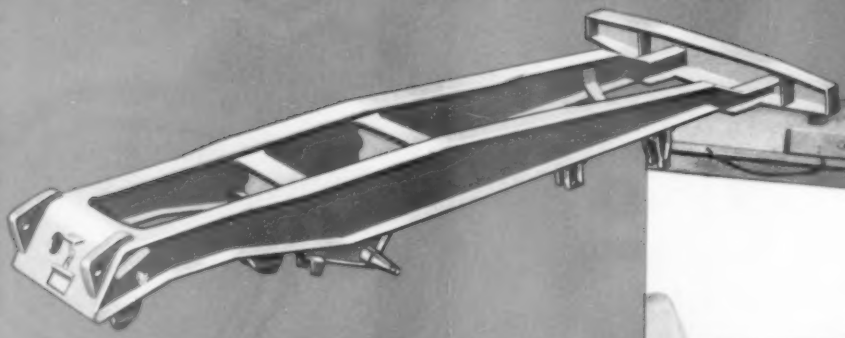
Made to master the heavy loads increasingly commonplace in the mining, quarrying and construction industries is Mack's new M-30X Model four-wheel end-dumper chassis.

This new addition to the Mack line of off-highway vehicles retains many of the time-proved features that have won Mack construction trucks worldwide fame for complete reliability and performance far surpassing lesser vehicles.

Add the many significant features exclusive to the Mack M Model . . . features that make the M-30X Model even more rugged, powerful, dependable and safe . . . and you have a vehicle sure to be first choice among those who must haul huge tonnages profitably.

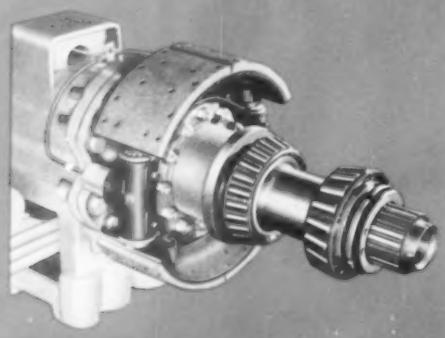
Heaviest-duty Mack rear axle, combining hypoid carrier with Planidrive,® keeps M-30X hustling where others bog down. With Mack's patented Planidrive planetary gear drive in the rear axle hubs giving the dig-out torque needed for heavy off-highway hauling, the Mack Model M-30X boasts one of the strongest, longest-lived rear axles of any 4-wheel dumper in the field. Drive is through exclusive single-reduction hypoid Mack carrier, with planetary gears. Suspension is by extra long, extra broad semi-elliptic progressive-rate leaf springs with cam face slipper ends and radius rods.

New tubular front axle withstands heavier loadings. Steel tubing, seven inches in diameter, with walls ¾″ thick is welded to cast ends to provide a reversed-elliott front axle that withstands the most punishing loads of quarrying, construction or mining.



Five-crossmember frame shrugs off jarring drop loads of big shovels. Typical of Mack off-highway truck construction practices, the frame of the M-30X Model is extra solid, extra strong. Five crossmembers, including integral front and rear bumpers, tie alloy steel fabricated I-beam main rails together to provide wrack-free support. Crossmembers are welded to web of main rails to prevent stress concentration in flanges. All corners are gusseted, with gussets welded to webs.

New massive, functional cab for extra strength, driver comfort. Completely new in appearance, the Mack M-30X cab is not only rugged, but completely functional. Efficient modern lines offer a reverse-slope windshield which lessens glare and reflections while reducing dirt and dust accumulation. Forward position permits heavier loading of new, larger-capacity setback front axle. Offset cab design provides maximum vision forward and behind for quicker spotting, quicker dumping, safer truck operation. Piano-hinged cab doors give extra strength, double cab venting gives extra comfort. Interior layout features easy accessibility and instrument visibility . . . lets driver concentrate on the job.



Unsurpassed stopping power—another M-30X feature. Shouldering a 30-ton payload demands safe, sure braking power. But the M Model's braking system more than meets the challenge. Front brakes are air, supplied by a 12 cu. ft./m. compressor, while rear brakes are air-hydraulic. Separate master cylinders at rear brakes provide safety factor in case of failure at either wheel. All brakes are internally expanding with simplified adjustment.

Mack Model M-30X

Built to extra-heavy-duty specifications

PAYLOADS: Rear dumper, 30 tons

WHEELBASE: 165"

PLATFORM LENGTH: 144"

OVER-ALL LENGTH: Front bumper to end of body, 323"

DIESEL ENGINES: 320 hp to 380 hp, six-cylinder diesel engines

COOLING SYSTEM: 1500 sq. in. frontal radiator, continuous finned, flat-tube

ELECTRICAL SYSTEM: 12-volt, 55-amp.

STARTING: Electrical, 24-volt

TRANSMISSIONS: Mack, selective, constant-mesh, 8 speeds forward, 2 reverse; optional Torqmatic transmission and Torqmatic brake; integral torque converter and planetary transmission selective shift

CLUTCH: Two-plate, air-assist with manual actuation

REAR AXLE: Single-reduction hypoid carrier, with final reduction Mack Planidrive planetary gear reduction within wheel hubs

FRONT AXLE: Mack, heavy-duty, tubular, welded cast ends

BRAKES: Front, air; rear, air-hydraulic; rear wheels with separate air and hydraulic cylinders to prevent complete loss of braking in event of failure at one wheel; 12 cu. ft. compressor

FRAME: Alloy steel, wide-flange I-beam, 137 section-modulus

STANDARD BODY: Heavy-duty 100,000 psi alloy steel

CAPACITY: Struck, 20 cu. yd.; heaped SAE rating, 25.5 cu. yd.

SPRINGS: Front, semi-elliptic, progressive rate; rear, semi-elliptic, progressive rate with cam face slipper ends and radius rods

WHEELS: Cast-spoked

TIRES: 18.00 x 25, 24-ply tubeless on 13.00 rims

STEERING: Hydraulic power-steering, 30' turning radius

DUMP HOIST: Twin, double-acting, outboard mounted, two-section telescopic cylinder assembly, providing 60° dumping angle

POWER TAKEOFF: Mack, 50 hp

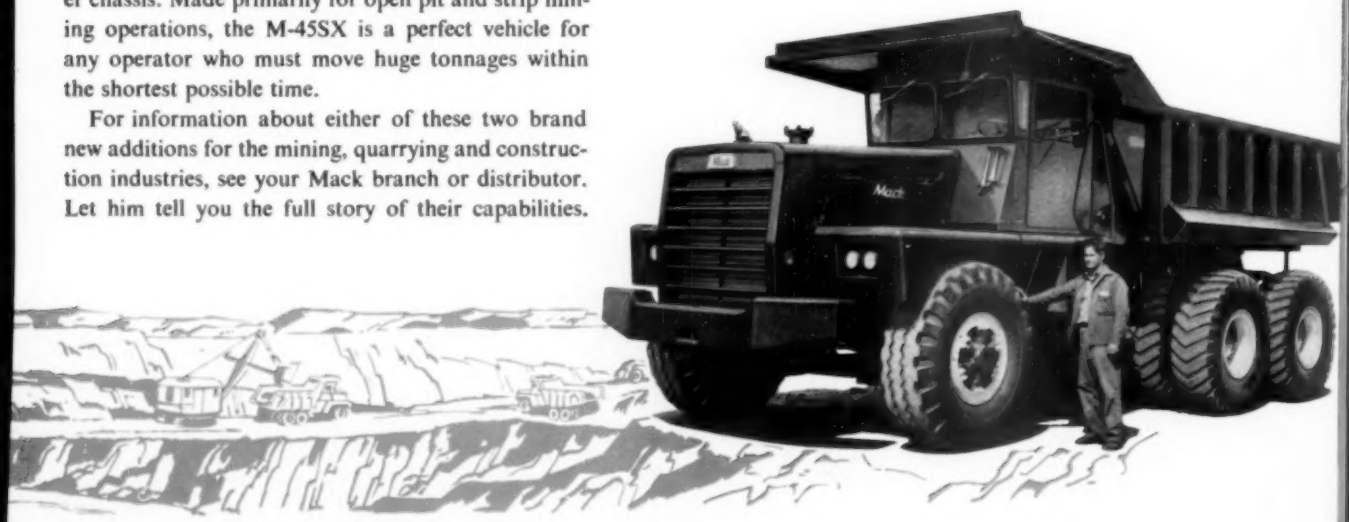
OPTIONS: Air-starting; rock ejectors

MACK FIRST NAME FOR **TRUCKS**

Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario

Mack M-45SX Model—six wheel, 45-ton mining-duty dumper. Unmatched capacity in the heavy-duty hauling field is offered in this companion to the M-30X—the remarkable Mack Model M-45SX six-wheel dumper chassis. Made primarily for open pit and strip mining operations, the M-45SX is a perfect vehicle for any operator who must move huge tonnages within the shortest possible time.

For information about either of these two brand new additions for the mining, quarrying and construction industries, see your Mack branch or distributor. Let him tell you the full story of their capabilities.



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(Continued from page 52)

Texas Portland Cement operations are described

DURING THE REORGANIZATION of Texas Portland Cement Co., the company's trustees are keeping stockholders informed of principal events. In their recent newsletter, they said that modifications in the operating procedures and physical plant layout are permitting greater production—it has gone from 1,500 to 1,900 bbl. per day.

Sales are satisfactory, say the trustees, Chilton O'Brien and Martin Davis. However, lack of adequate finished cement storage capacity makes it difficult to coordinate demand for cement with production capacity. At this time they cannot justify the expenditure of the amount necessary to install additional storage capacity.

As far as the status of the reorganization plan is concerned, the trustees said that they believe that within this calendar year the earning capacity of the business can be determined. This and the amount of valid indebtedness are the factors which must be known before a proper plan of reorganization can be formulated.

Subsidiary merges with Potash Co. of America

JOHN W. HALL, president of Potash Co. of America, Denver, Colo., announced the merging with its Canadian subsidiary, Potash Co. of America, Ltd. The move, he said, indicates that the parent company is determined to move forward with the development of the Canadian property.

Operations of the subsidiary near Saskatoon, Sask., have been suspended since last November because of water seepage into the mining shaft. A water-control project now under way will take until next spring and cost about $900,000, said Mr. Hall.

Kaiser Gypsum Co. wins safety award in Seattle plant

A SAFETY-AWARD PICNIC was enjoyed in Seattle, Wash., recently by employes of the local Kaiser Gypsum Co., Inc., and their families. Highpoint of the festivities was a presentation ceremony in recognition of the company's outstanding record for industrial safety. It had chalked up almost 400,000 man hours with no time out for accidents.

An impressive wall plaque mounted with the State of Washington Award of Merit was accepted on behalf of the employes by Acting Plant Superintendent C. E. Caprye (shown at right above).

John Lombardini, general safety inspector for Washington State (left), offered the citation with the comment that only a few companies are so honored by the Evergreen state each year.

(Continued on page 59)

THIS AUTOMATIC BAG PALLETIZER will save you money!

The Miller Palletizer automatically positions bags in proper pattern on the roller table. A completed pattern then moves across the rollers to an elevator, which descends one position as each layer is added. At full load position, the stack and pallet move automatically from the elevator for pick-up by a fork truck.

IF your plant is operating around the clock (7 days per week, 24 hours per day), and —

IF bag stacking is a part of that operation —

the **MILLER AUTOMATIC PALLETIZER** *is almost certain to save you money.* This completely automatic, operatorless unit is specifically engineered to slash production costs in two- and three-shift plants.

Just compare the cost of your present stacking operation with that of a Miller Automatic Bag Palletizer. (Price: $25,000-$30,000).

While you're thinking about it, write for bulletin describing operation of the Miller Automatic Palletizer in detail!

MILLER ENGINEERING CORPORATION

119-D East Barbee Avenue
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IF PURCHASES ARE ENDORSEMENTS...

P&H is the № 1 choice in Quarrying

IN THE LAST 5 YEARS 75% OF ALL ELECTRIC SHOVELS INSTALLED IN U.S. QUARRY OPERATIONS HAVE BEEN P&H

4½-cubic yard P&H Model 1400 is also built as a diesel-electric to provide its own integral electric power supply for operation in areas remote from public utility sources.

P&H has earned this widespread acceptance in the quarrying industry because of lower per-ton loading cost. This day-to-day benefit to owners of P&H Electrics results from two basic advantages:

1. **Higher rate of production** made possible by exclusive, patented P&H design principles: MAGNETORQUE® Hoist Drive and Electronic Control.
2. **Vastly superior service and parts availability** reflecting Harnischfeger Corporation's partnership philosophy of responsibility to buyers of its products.

Compare before you buy—for more information write today to Dept. 533-A Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER P&H
Milwaukee 46, Wisconsin

(Continued from page 57)

Basic gets New York Stock Exchange listing

BASIC INCORPORATED, Cleveland, Ohio, was admitted recently to trading on the New York Stock Exchange. The company's stock had previously been listed on the American Exchange.

In an opening ceremony, President H. P. Eells, Jr., said that 1.2-million shares of common stock were listed. The company has over 2,900 owners of BAI (the new ticker symbol) at present.

Basic's net income for the first six months of 1960 was $980,439 on sales of $14.5 million. Comparable net income in 1959 was over $1.4 million on sales of $14.6 million. Earnings per share in 1960 were 79¢ on outstanding shares of common stock totaling 1.17 million compared to $1.22 in the 1959 period as adjusted to the existing capital structure.

The company, a major producer of grain refractories and other equipment of steelmaking furnaces, manufactures lime and magnesia products for the building industry and for industrial processing and agriculture.

The reduced net income in 1960, Mr. Eells explained, was largely due to increased labor and operating costs not compensated for by price increases. A significant expansion of the company's Nevada facilities is nearing completion, however, to meet a growing market for magnesia refractories and chemical products.

Britains buy stake in Canada Cement Co.

ASSOCIATED PORTLAND CEMENT MANUFACTURERS, Great Britain, has bought 10 percent of the outstanding shares of Canada Cement Co. Parent company of a world-wide organization, APCM has been operating on the West Coast of Canada through Ocean Cement and Supplies, Ltd., which owns British Columbia Cement Co. It operates 29 plants in the United Kingdom with capacity of 50 million bbl., and is interested in plants in Australia, New Zealand, Malaya, South Africa, Southern Rhodesia, Nigeria, Kenya and Mexico.

Canada Cement, largest producer of the Canadian cement industry, operates nine of the 19 cement plants in Canada and accounts for about half of the installed capacity of 48 million bbl.

(Continued on page 60)

WHY THE FASTEST WAY TO CUT DRILLING COSTS IS... A SCHRAMM ROTADRILL

1 you switch to a modern self-contained self-powered unit

complete with a Schramm 125 cfm compressor

one man drills and drives

2 you save

cost of separate tractor, compressor and wagon drill

3 and you save cost of extra man or men

4 your driller can: use a Schramm Rotatool for hard rock

use a Schramm Lazy Susan Pipe Holder

holds 3 lengths one man can change steels

600 blows a minute

drill bigger holes faster

to 4½"

get wider spacing for lower cost rock removal

Get the full story of how the Schramm Model P-41 Rotadrill can cut your drilling costs. Write for Catalog and the name of your nearest dealer.

Schramm

ROTADRILLS and ROTATOOLS

645 North Garfield Ave., West Chester, Pa.

Schramm, Inc., manufacturers of Rotadrills (Pneumatractor Mounted, Truck Mounted, Crawler Mounted), Air Compressors (Portable, Stationary) Self-propelled Air Compressors (Pneumatractors) and Booster Compressors.

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Specify the **MODEL**
Get the 3-speed auxiliary designed for your job.

HIGH CAPACITY... WIDEST RANGE OF RATIOS... OPTIONAL TOP-MOUNTED POWER TAKE-OFF... LOW INITIAL COST, LESS MAINTENANCE... AVAILABLE FROM ALL LEADING TRUCK MANUFACTURERS ON SPECIFICATION

Choose from 16 Models of FULLER Three-Speed Auxiliaries

FULLER MANUFACTURING COMPANY
(Transmission Division)
KALAMAZOO, MICHIGAN
Subsidiary EATON Manufacturing Company
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(Continued from page 59)

Phosphate processors expand Florida plants

A WALL STREET JOURNAL report on the Florida phosphate industry indicates that producers are spending more than $33 million on expansion of processing facilities. In this area, where about 75 percent of the phosphate rock used in the U. S. is produced, additions are being made to plants so that demand for chemically refined phosphate concentrates can be met.

Production of triple superphosphate has expanded greatly over the past five years. Other gains are noted in production of diammonium phosphate, which contains phosphate, nitrogen and potash. Specifically, the article traces expansion moves by the following firms:

- Virginia-Carolina Chemical Corp. has just completed a $12-million expansion program which boosts triple superphosphate capacity from 100,000 to 300,000 tons per year. It also is installing a 100,000-tpy. diammonium phosphate unit.
- U. S. Phosphoric Div. of Tennessee Corp. plans a 50-percent expansion of its treatment facilities at Tampa. It will install an ammonia production plant to supply nitrogen for its expanded diammonium phosphate processing unit.
- American Cyanamid Co. is boosting processing facilities by at least 25 percent.
- Davison Chemical Co., a division of W. R. Grace & Co., also is boosting facilities by at least 25 percent. The company is moving into the diammonium phosphate field.
- Swift & Co. plans to open a new phosphoric acid plant south of Bartow, Fla., next year. Like Davison, it is moving into the diammonium phosphate field.
- International Minerals & Chemical Corp. is said to be considering a major expansion of its plant at Bartow.
- American Agricultural Chemical Co. is planning a minor addition.

NLI committee on material utilization

A COMMITTEE ON RESEARCH projects for full utilization of materials has been formed by National Limestone Institute, Inc. Its chairman is Arthur R. Alvis, and members include: W. L. Bryan, William J. Clark, William D. Dillon, Buford V. Everett, L. R. Falk, Leonard S. Fry, Chester Hopper, Roger Ivey, D. W. McLellan, Leon Meshberger, J. B. Mount, George E. Nettels, Jr., Robert M. Patton, Cecil R. Pottorf, John H. Riddle, Paul W. Seitz, E. B. Snead and R. S. Walters. The first meeting was held June 13 at the Edgewater Beach Hotel, Chicago, Ill.

Netherlands Antilles gets lime plant

THE BONAIRE LIME PLANT, N.V., recently started production on Bonaire, an island in the Netherlands Antilles. The new enterprise has a standing order to supply lime in substantial quanties to Shell Curacao, N. V., a large oil refinery. Other consumers in the area, such as the water plant at Aruba, are potential markets.

END

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946. (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF ROCK PRODUCTS, published monthly at Chicago, Ill., for October 1, 1960.

1. The names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher—Maclean-Hunter Publishing Corp., 79 W. Monroe St., Chicago 3, Ill.

Editor—George C. Lindsay, 79 W. Monroe St., Chicago 3, Ill.

Managing Editor—Charles R. Kluge, 79 W. Monroe St., Chicago 3, Ill.

Business Manager—P. D. Allen, 79 W. Monroe St., Chicago 3, Ill.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Maclean-Hunter Publishing Corp., 79 W. Monroe St., Chicago 3, Ill. The stockholders of the Maclean-Hunter Publishing Corp. are P. D. Allen, 789 Valley Rd., Glencoe, Ill.; Joseph J. O'Neill, 14 Lincoln Court, Lombard, Ill.; F. S. Chalmers, 755 Avenue Rd., Toronto, Ont., Canada; Horace T. Hunter, 120 Inglewood Drive, Toronto, Ont., Canada; Maclean-Hunter Publishing Co., Ltd., 481 University Ave., Toronto, Ont., Canada.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which the stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.) . . .

P. D. Allen
Publisher

Sworn to and subscribed before me this 16th day of September, 1960.

[SEAL]

Clara M. Brockschmidt
(My commission expires March 16, 1964.)

Drill hard rock faster with your rotary rig and the

GARDNER-DENVER "MOLE-DRIL"®

Now—add new versatility to your rotary drilling rig with the Gardner-Denver "MOLE-DRIL"* in three sizes: AM4 (4" dia.), AM5 (5" dia.) and AM6 (6" dia.).

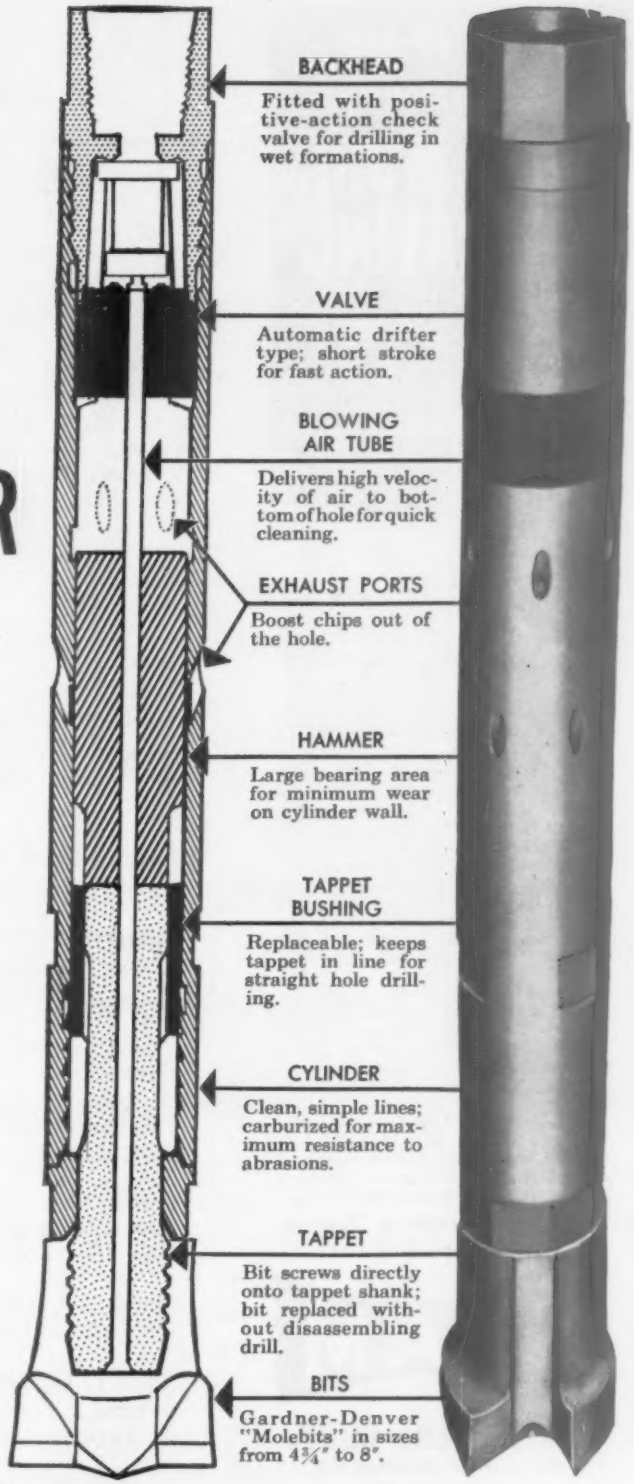
Add new power for fast hard-rock drilling with the heavy-duty, percussion-type "MOLE-DRIL." It screws directly onto your drill pipe . . . works at the bottom of the hole right at the rock face. There's no power-draining rod between the hammer and the bit.

ONLY 3 MOVING PARTS

Rugged construction cuts down time. Simple design reduces wear and trouble. Only three moving parts: valve, hammer and tappet. Compare these Gardner-Denver "MOLE-DRIL" features right down the line:

FOR FULL DETAILS,
WRITE FOR BULLETINS.

*Trade-Mark


BACKHEAD
Fitted with positive-action check valve for drilling in wet formations.
VALVE
Automatic drifter type; short stroke for fast action.
BLOWING AIR TUBE
Delivers high velocity of air to bottom of hole for quick cleaning.
EXHAUST PORTS
Boost chips out of the hole.
HAMMER
Large bearing area for minimum wear on cylinder wall.
TAPPET BUSHING
Replaceable; keeps tappet in line for straight hole drilling.
CYLINDER
Clean, simple lines; carburized for maximum resistance to abrasions.
TAPPET
Bit screws directly onto tappet shank; bit replaced without disassembling drill.
BITS
Gardner-Denver "Molebits" in sizes from 4¾" to 8".

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NEW DE-LINE annunciator has 70% MORE ENGRAVING AREA for more precise trouble legends

Scam De-Line annunciators, your systems' sentry, now offers the new MAGNA-PLAC nameplate which provides 70% more engraving area.

The MAGNA-PLAC nameplate gives the engineer increased space to more accurately describe condition variations or to employ larger characters for greater visibility. It is interchangeable with standard Scam nameplates and optionally available *without extra charge.*

Other De-Line features include side or stack mounting for practical, *economical* system expansion; a single plug-in relay for both normally open *or* normally closed contacts; and sequence options *after* installation.

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CALENDAR

OF COMING EVENTS

1960

Nov. 16-17, 1960—Bituminous Concrete Association of Pennsylvania, Annual Meeting, Hotel Edison, Sunbury, Pa.; and Bituminous Concrete Highway Conference, Coleman Hall, Bucknell University, Lewisburg, Pa.

Dec. 8-9, 1960—Missouri Limestone Producers Association, 17th Annual Convention, Governor Hotel, Jefferson City, Missouri

1961

January 17-19, 1961—National Limestone Institute Inc., 16th Annual Convention, Statler-Hilton Hotel, Washington, D.C.

January 17-20, 1961—National Crushed Stone Association, Annual Convention, Hotel Americana, Bal Harbour, Fla.

January 23-26, 1961—National Sand & Gravel Association, Annual Convention, Hotel Americana, Bal Harbour, Fla.

Jan. 29-Feb. 3, 1961—American Society for Testing Materials, Committee Week, Netherland Hilton Hotel, Cincinnati, Ohio

February 20-23, 1961—American Concrete Institute, 57th Annual Convention, Chase-Park Plaza Hotels, St. Louis

Feb. 28-Mar. 2, 1961—American Institute of Mining, Metallurgical & Petroleum Engineers, Annual Meeting, Chase Hotel, St. Louis, Mo.

March 5-8, 1961—American Road Builders Association, 59th Annual Convention, Atlantic City, N.J.

April 12-14, 1961—American Institute of Mining, Metallurgical & Petroleum Engineers, International Symposium on Agglomeration, Sheraton Hotel, Philadelphia, Pa.

April 18-20, 1961—American Institute of Electrical Engineers, Cement Industry Technical Conference, The Sheraton-Cadillac, Detroit, Mich.

June 25-30, 1961—American Society for Testing Materials, 64th Annual Meeting, Chalfonte Haddon Hall, Atlantic City, New Jersey.

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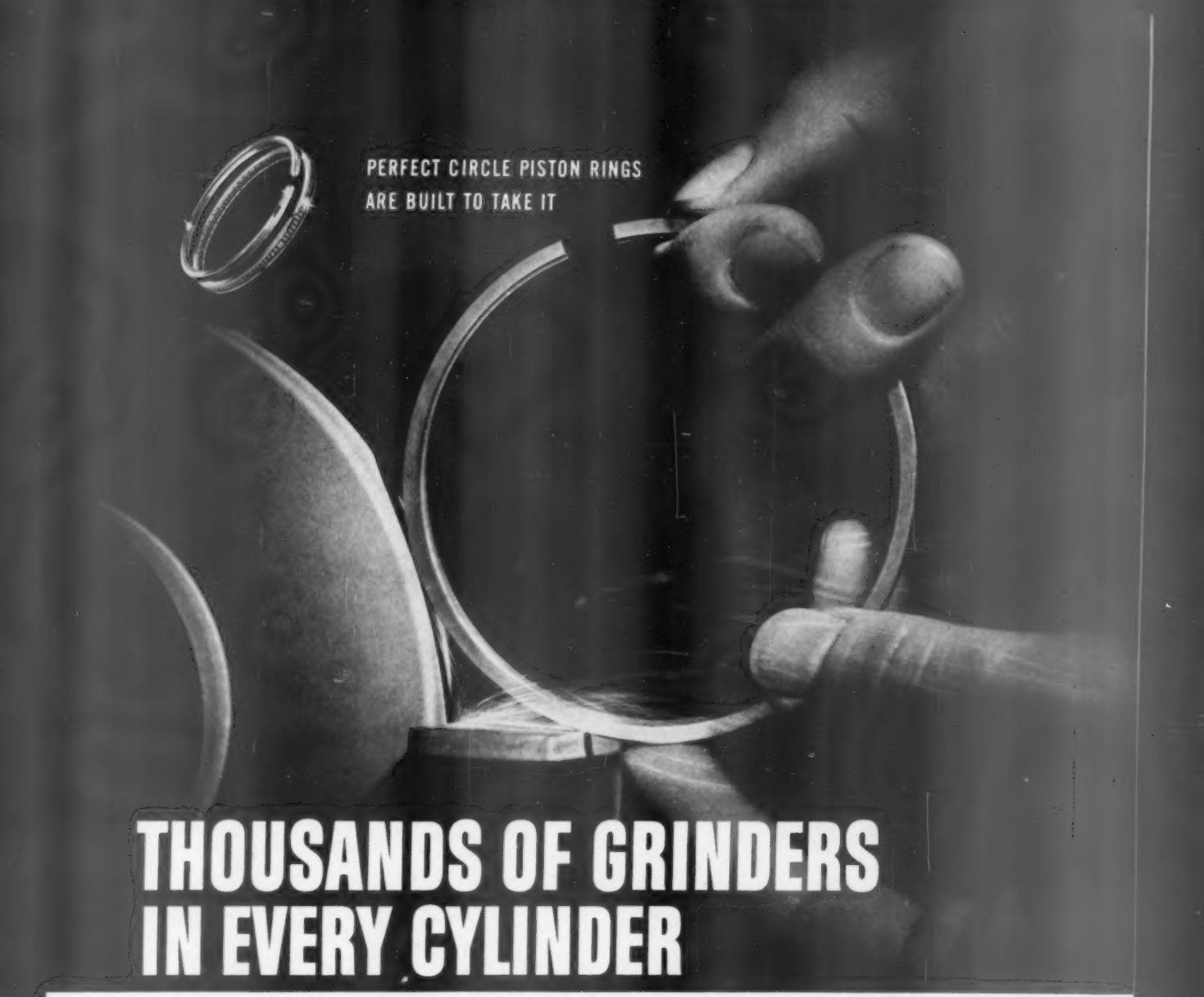

THOUSANDS OF GRINDERS IN EVERY CYLINDER

Dirt particles in a cylinder act just like tiny grinding wheels to wear away the face of a piston ring. To protect against this abrasive wear, Perfect Circle 2-in-1 rings are plated with solid chrome—the hardest, longest-wearing surface you can buy.

As a result, wear is reduced an average of 75% over non-plated rings. And, Perfect Circle's chrome plating is 25% thicker than the average of competitive plated rings to provide extra protection and extra life.

In every way, Perfect Circle rings are built to take it. Insist on Perfect Circles—first choice of leading engine manufacturers and mechanics everywhere.

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PISTON RINGS · PRECISION CASTINGS · POWER SERVICE PRODUCTS · SPEEDOSTAT

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HINTS & HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Truck-loading habits

LOADING A TRUCK with a tractor shovel can be sometihng like getting on a horse—it works better if you stay on the left-hand side. A number of producers have found that it pays to stick to this safe habit of loading trucks from the driver's side. Even though the truck can't kick like a horse, it seems to be easier on driver and operator for the trucks to be loaded in a prearranged and agreed-on way.

Then it becomes a natural and useful technique to fit the front-end loader's bucket with a lip that keeps material from spilling on top of the cab. The lip guides the shovel operator to place the bucket very close to the cab before dumping. At the same time, it lets him put a lot more material in the front part of the body and eliminates spillage over the rear end.

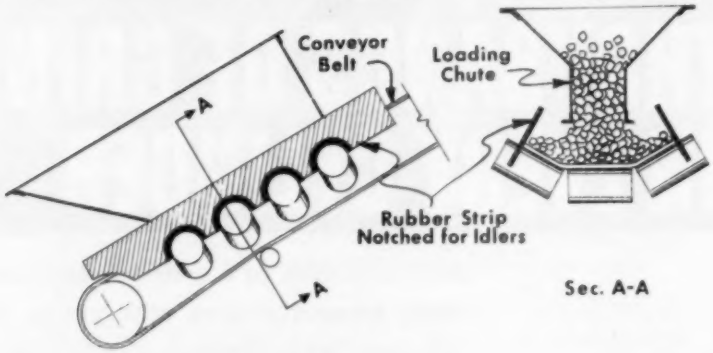
Belt conveyor accessories

THERE ARE PLENTY of accessories for belt conveyors that have improved their effectiveness for many rock products producers. Unfortunately, there is all too little definite information available and virtually all information must be passed around by word of mouth.

Here are two gadgets that have proved to be particularly useful to several crushed stone producers—a metal detector and a load-sensing switch. This metal detector does more than just stop the belt conveyor when it senses a bit of magnetic tramp iron in the material on the loaded belt. It operates a switch that opens a small gate to put a puff of white limestone dust right on the darker stone where the iron is. In this way, the operator doesn't have so much material to work over to find the metallic scrap.

The load-sensing switch is the device that tells the operator in his control tower if the conveyor is full or empty. A small diameter, semi-pneumatic wheel is mounted under the conveyor. When the belt is empty it does not contact the wheel. But with material on it, the belt is depressed until it turns the wheel. The wheel's mounting arm closes the circuit that shows a light on the control panel.

Refinements in conveyor design pay off



THE DESIGN of skirtboards on belt conveyor transfers is one of the refinements of good design. But too frequently this detail is neglected since it calls for a lot of costly detailing and very little fabricated material.

Many producers are finding that the extra expense usually is well justified. Improperly designed skirtboards can quickly wear grooves in even the thickest conveyor belt. And the cost of even a short belt can easily exceed the expense of a few hours of engineering time.

A western producer went one step further to design the skirtboards of his conveyors. Instead of bolting the skirts to the lower edge of the steel transfer chute or hopper, the designers notched the soft rubber skirt strips to match the contours of the conveyor idlers. Steel support strips are then supported by brackets from the chutes or by angles coming up from the conveyor frame.

The rubber skirts have friction contact only with the edge of the conveyor belt—probably its least vulnerable part. A big design advantage is the ability of the material to spread out naturally on the belt while the skirtboards merely keep the material from falling off the belt.

END

25% more hole per hr.

in hard limestone with high silica content

...than with competing rig

Quarry performance like this is standard with REICHdrill. Why? Because:

- ...all-hydraulic top-drive rotary provides infinitely variable speed of drill rotation – the right speed for every formation.
- ...direct-drive to drill stem saves power loss.
- ...all air used to drill and clean hole.
- ...no complicated transmission, no rotary table.
- ...no kelly bar – in and out of the hole faster.
- ...instant safety torque release protects all drive components.

REICHdrill has built a reputation for keeping maintenance costs low; footage records high.

And these additional REICHdrill features help set drilling records: masts incline for angle drillings; CP heavy-duty compressors assure plenty of air to meet all demands; fast-acting, ram-type hydraulic leveling jacks permit use of most rig weight for down pressure; CP "Air-Blast" Bits for extra footage in toughest formations.

For further information, write:

REICHdrill

1439 ASH STREET, TERRE HAUTE, INDIANA

Division: CHICAGO PNEUMATIC TOOL CO.

T-650 truck-mounted REICHdrill operating in a quarry. Hole size: to 7⅞"; down pressure: 30,000 pounds. Other models available, truck or crawler mounted, with hole size to 16 inches, down pressure to 90,000 pounds.

Enter 1013 on Reader Card

ROCK PRODUCTS

November 1960

Brunswick plant taps rich new source of gypsum to penetrate new market area

Bestwall surges into deep South

by Elwood Meschter

LEAN AND ENERGETIC Bestwall Gypsum Co. ranks third in the highly competitive building products industry. But this gypsum producer is second to none in ambitious plans for capturing new markets and expanding its productive capacity to serve them.

A sparkling new gypsum-board plant at Brunswick, Ga., is the first unit in a master plan to double production within the next two years. This $8-million plant will be able to make more than 300,000,000 sq. ft. of ⅜-in. board and 100,000 tons of bagged plaster products a year—a lusty boost to the company's over-all capacity.

Brunswick will put Bestwall's foot firmly in the door to burgeoning construction markets in the Deep South. The highly instrumented new plant will process gypsum rock from an economical new source with taut efficiency. Finished products will move over the highways and railroads that fan out from Brunswick into the South's population centers.

Raw materials will come right to the doorstep of the new plant at the water's edge. Warm-water shipping will bring gypsum from the Dominican Republic. Fuel oil to fire the big gypsum kettles comes in from the Gulf Coast.

The new plant includes design details that provide many features for efficient operation. These were developed by Bestwall's manufacturing men in collaboration with the consulting engineers. High capacity has been combined with exceptional efficiency. At the same time, flexibility lets the new plant switch quickly from one product to another to meet the demands of the market. The layout has included place for adding new equipment to expand output with modest additional expense.

- High capacity is assured with five big kettles, one of the longest, fastest board lines in this country and three bagging machines for plaster and specialty products. This equipment, along with other production machinery is regulated by automatic controls.
- Production flexibility is built into the flow of materials. Soap, starch, asphalt and vermiculite can be added at the pin machine. Ingenious layouts for the flow of plaster permit an unusual number of alternative flows.
- Expansion has been provided for.

Raw gypsum comes from Sal y Yeso, a Dominican corporation formed to develop a vast deposit of gypsum rock in that country. The deposit has been blocked out with Bestwall's cooperation and has been brought into production at Las Salinas in

Please turn page

LEFT: Dominican gypsum is unloaded onto a belt conveyor, first unit in a high-capacity raw materials handling system

RIGHT: Raw gypsum rock is kept in a 50,000-ton covered storage building near the municipal wharf at Brunswick

BESTWALL SURGES INTO DEEP SOUTH

continued from page 67

southwestern part of the Dominican Republic. The quarry has been retooled for high-capacity production; the seaport at Barahona, with rock-storage and shiploading conveyors.

The municipal dock at Brunswick is fitted with a gantry crane that unloads the 10,000 to 20,000-ton ocean-going vessels. The minus 5-in. gypsum rock is put into Bestwall's belt conveyor system at about 600 tph. Then it is taken to the peak of a 50,000-ton capacity tent-roofed storage building where the rock is distributed with a traveling belt tripper. Bunker C oil is stored at the wharf in a tank holding about 420,000 gal.

Gypsum is reclaimed from storage through eight manually controlled vibrating feeders suspended from the roof of the concrete reclaim tunnel. Manual control was dictated by the need for a man to observe the size of material coming out of each feeder. Only in this way can a desirable mixture of coarse and fine rock be put on the reclaim belt conveyor.

A 24 x 60-in. single roll crusher reduces gypsum rock to minus 1½ in. The crusher is protected from magnetic scrap by a big electromagnet suspended above the crusher opening. The magnet is suspended with a small chain hoist that permits the assembly to be swung clear of the head of the belt conveyor. The belt is equipped with a band brake that prevents the loaded conveyor from retreating downhill when it is stopped to clear the magnet.

Crushed gypsum is taken to a pair of 5 x 14-ft. vibrating screens that scalp off oversize and send it back to the crusher on a belt conveyor. These two double-deck screens are placed high in a building to give headroom to discharge gypsum into rail cars under the screens. In this way, the flow of gypsum can be tapped to ship rock to portland cement plants or to chemical plants.

Through-screen fines are conveyed from the screen house to a pair of storage tanks in the main plant. These are 240-ton circular steel bins—first units in the process. Ordinarily, one of these tanks is filled while the other provides the material for the fine grinding mill—next stop in the system. Each tank is fitted with an overflow control that signals the operator when the tank is completely filled. Empty-bin controls in the chute directly above the roller mill signal when the storage tank is nearly empty.

Each primary storage bin supplies a roller mill. Each mill is fed with an apron feeder with variable speed drive that draws gypsum out of storage at a selected rate. However, the bottom of each bin is fitted with a chute that bypasses the feeder. In an emergency, the flow of gypsum to the mill can be regulated with a manually controlled slide gate.

A stream of hot air through the mill lifts the finely ground rock to a single whizzer separator. There the 100-mesh product is flash dried to remove the normal 3 to 5-percent moisture in the rock.

An automatic control system regulated from the exhaust-vent temperature maintains a constant final moisture. This is essential to prevent overdrying. Combined water is removed under the carefully controlled conditions in the kettles to leave part of the combined water with the gypsum —$2(CaSO_4).H_2O$.

Finely ground, dried gypsum is distributed among the five steel storage tanks with a screw conveyor sytem that picks up the accepted material from the two big air separators. Oversize is chuted back to the mill to be reground and recycled through the system. Land plaster can be taken from the screw conveyor system and diverted directly to the bagging area.

There are five oil-fired kettles at Brunswick. Each receives raw material from its storage bin through a double-screw tubular feeder. These feeders rapidly recharge the kettle with an exact amount of material immediately after the preceding batch has been discharged. The operation of the feeders can be fully automatic or manually controlled.

A single operator supervises the operation of the five kettles as the gypsum progresses through its "boil" to discharge into the hot pit below each kettle. Hot pits are insulated boxes that hold surges of hot stucco while the material is drawn off to storage tanks.

Dust control is an important part of the new plant. A large electrostatic precipitator removes micron-sized particles from kettle hot exhaust gases and, along with other mechanical collectors, results in an immaculate installation.

Four tubular screw feeders draw the slowly cooling stucco from each hot pit. Each can discharge to one of two screw conveyor systems leading to storage. One system handles material to the board plant storage tanks; the other, to the plaster system. Each system puts material through a sifter that removes any oversize particles. Either system sends material to board line storage tanks or to one of the two tanks above a tube mill. A small tube mill is used to prepare plaster for bagging, and tubed plaster is sent to one of four large storage tanks above the bagging machines.

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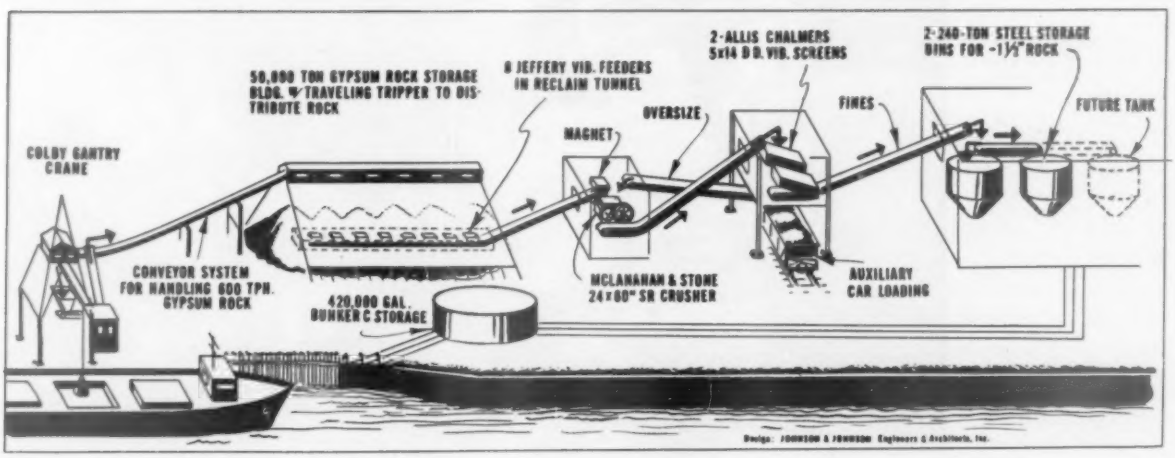
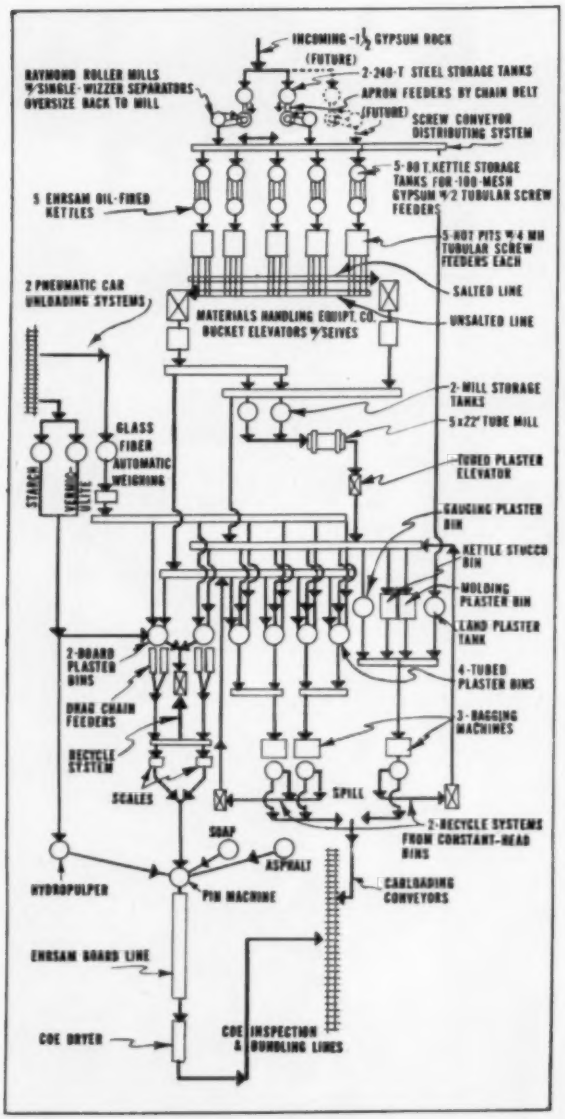
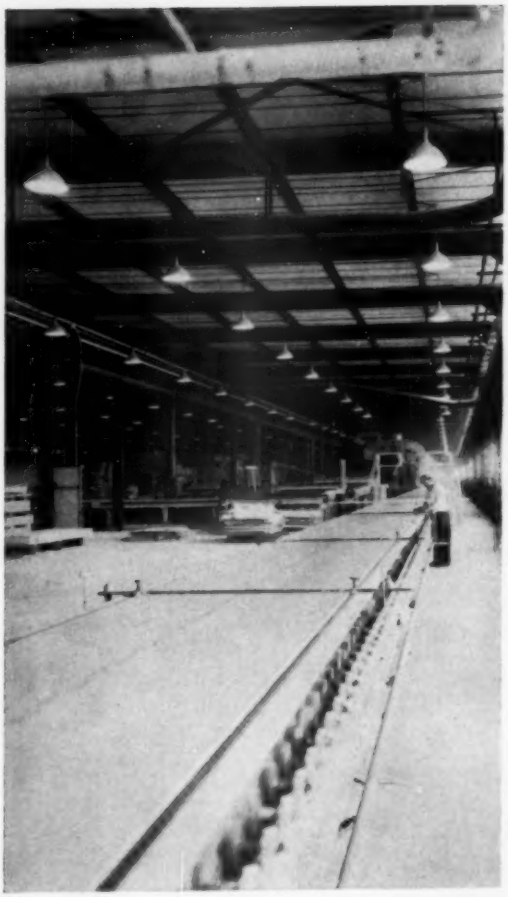
THIS IS ONE OF TWO MILLS that grinds and dries raw gypsum to precision fineness and moisture with automatic controls

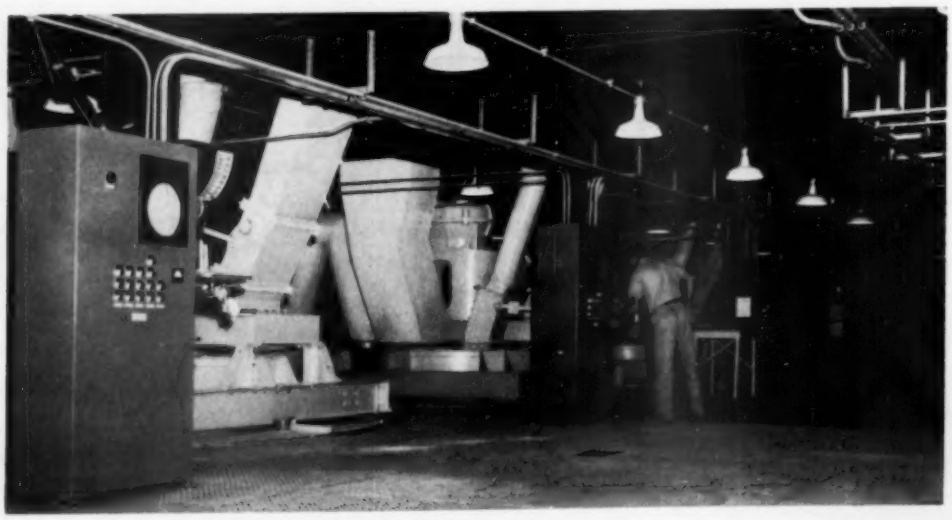

50,000 TON GYPSUM ROCK STORAGE BLDG. W/TRAVELING TRIPPER TO DISTRIBUTE ROCK
8 JEFFERY VIB. FEEDERS IN RECLAIM TUNNEL
2-ALLIS CHALMERS 5x14 D.D. VIB. SCREENS
2-240-TON STEEL STORAGE BINS FOR -1½" ROCK
OVERSIZE
FINES
FUTURE TANK
MAGNET
COLBY GANTRY CRANE
CONVEYOR SYSTEM FOR HANDLING 600 TPH. GYPSUM ROCK
420,000 GAL. BUNKER C STORAGE
McLANAHAN & STONE 24x60" SR CRUSHER
AUXILIARY CAR LOADING
Design: JOHNSON & JOHNSON Engineers & Architects, Inc.





ABOVE: The board line at Brunswick is said to be one of the biggest and fastest in the gypsum industry

ONE MAN supervises the automatic operation of the 5 kettles. Each produces eleven 15-ton batches a day



BESTWALL SURGES INTO DEEP SOUTH

continued from page 69

Bestwall's board and bagged plaster products are offered with glass fiber reinforcement, although wood fiber reinforced and lightweight products are available.

Outstanding feature of Bestwall's products is the fiber glass that is added to both plaster board and bagged plasters. In addition, these products are also available with lightweight aggregate and wood fiber added.

Exceptional efficiency in handling these materials into storage and then into the processing system was achieved by attention to design details in the new plant. A pneumatic conveying system takes wood shavings from the box cars into an enameled steel storage tank. Another pneumatic conveying system handles vermiculite and starch into separate storage tanks or takes wood chips to a pulping setup.

The four storage tanks for tubed plaster serve two bagging machines in addition to the smaller tanks holding special plasters. A third bagging machine is reserved for bagging plaster with either glass fiber or wood fiber additives. The bottom of each tank is fitted with drag chain conveyors and variable speed drives to put plaster into the bagging circuit. These conveyors discharge material over a permanent magnet into a constant-head bin above the bag machine. Any excess carried beyond the constant-head bin is dropped to the boot of an elevator to be recycled in the system. In this way, the material in the bag machine hopper maintains a full bin and uniform density. This results in practically no variation in the weight of the packed bags.

A similar automatic system draws plaster from the two tanks that supply the board line. Two drag chain feeders under each bin pull material into a screw conveyor system. A bucket elevator lifts plaster to a screen to scalp off any stray oversize. Through-screen material travels in a screw conveyor to a weighing feeder. The conveyor always carries an extra amount of material, and any excess is recycled to the storage tanks through a conveyor and elevator system.

The board line and dryer are equipped with automatic controls. Synchronizing the whole system produces a board of exceptional uniformity and quality at high speed. At the end of the board forming line, each section is turned and automatic equipment pushes pairs of boards into the long dryer. At the end of the dryer, the long boards are flattened, snapped at the perforations and delivered to inspection, end-taping and bundling tables.

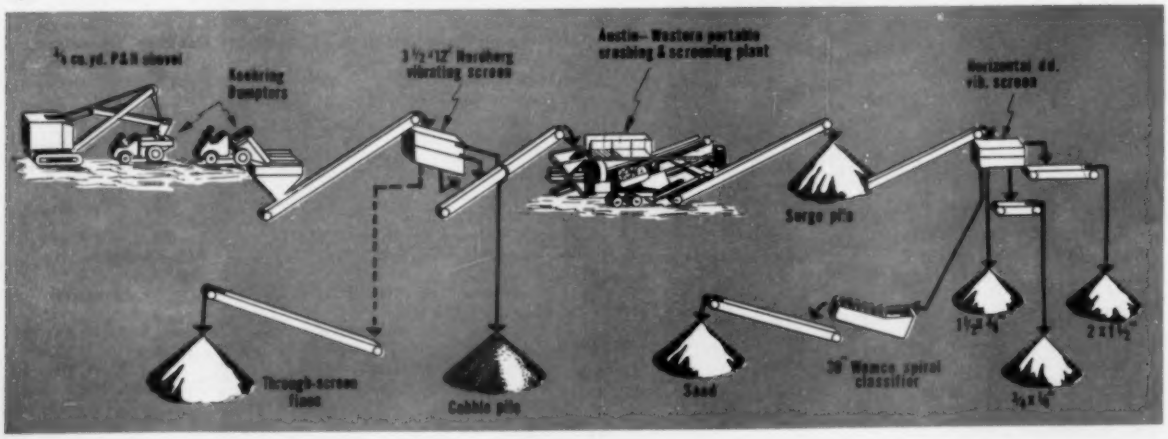
The design and construction of the Brunswick plant was a close collaboration between Bestwall Gypsum Co. and Johnson & Johnson Engineers & Architects, Inc. END

TUBULAR SCREW FEEDERS draw hot stucco from the hot pit under each kettle

MAJOR EQUIPMENT REFERENCE

Gantry crane	Colby Steel & Mfg. Inc.
Primary crusher, 24 x 60-in. SR.	McLanahan & Stone Corp.
Vibrating feeders, (8)	Jeffrey Mfg. Co.
Roller mills, 6058 (2)	Raymond Div. Combustion Engr.
Air separators, single whizzer (2)	Raymond Div. Combustion Engr.
Furnaces, (2)	Midwest Heat Service Co.
Elevators & conveying system	Materials Handling Equipment Co.
Electrostatic precipitator	Research-Cottrell, Inc.
Dust collectors	Wheelabrator Corp.
Gypsum kettles, (5)	J. B. Ehrsam & Sons Mfg. Co.
Hot pits, (5)	J. B. Ehrsam & Sons Mfg. Co.
Stucco handling system	J. B. Ehrsam & Sons Mfg. Co.
Plaster feeders & mixers	J. B. Ehrsam & Sons Mfg. Co.
Board forming line	J. B. Ehrsam & Sons Mfg. Co.
Board dryer	Coe Mfg. Co.
Board handling equipment	Coe Mfg. Co.
Bagging machines, 4-spout (3)	St. Regis Paper Co.
Tube mill	Allis-Chalmers Mfg. Co.
Cone crusher	Sprout Waldron & Co. Inc.
Wood fiber tank	A. O. Smith Corp.
Glass fiber handling system	Johnson & Johnson Engineers & Architects, Inc.
Wood chip handling system	Dracco Div., Fuller Co.
Permanent magnets, (3)	Eriez Mfg. Co.
Weighing scales, (3)	Fairbanks, Morse & Co.
Conveyor idlers	Transall, Inc.
Conveyor belts	U. S. Rubber Co.

PORTABLE CRUSHER provides feed for 100-tph. washing plant. It will be replaced later by a permanent crushing section



California producer puts zip into output with unit that fits several slots in aggregate production line

Portable plant keys expansion

by John H. Bergstrom

HOW CAN YOU EXPAND to take advantage of enlarged markets for aggregates without back-breaking equipment outlays? Richardson Brothers Sand & Gravel, Los Banos, Calif., (personified by George and Roy Richardson) faced this question when huge new building projects made an expansion program especially promising. The brothers found their answer in a 200-tph. portable crushing and screening plant. It is the key link that has permitted an orderly three-point expansion program.

● The Richardsons replaced a smaller portable with the new unit, tripling production of base material and hot-mix aggregates. The deciding factor in selecting a portable was its mobility which gave it the nod over a comparable permanent facility.

● The next step was a permanent 100-tph. washing plant that could easily be expanded to 150-tph. in the future. The following cost-cutting steps held the initial investment to a minimum, but still produced a plant that could turn out the necessary amount of specification aggregates.

The crushing section was temporarily eliminated, since it would be the plant's most expensive single component. Instead, the portable crusher is used to stockpile minus 2-in. material in a 15,000-ton surge pile to be drawn upon as needed.

An additional saving was made by designing the plant to produce only four products. Eventual expansion to 150 tph. will provide two additional products with no change in initial equipment.

As the plant now operates, the portable crushes enough material to bring the surge pile to capacity and goes on to other duties. This minus 2-in. material is drawn from a reclaim tunnel to a double-deck washing screen. Both horizontal decks are split and produce four products: 2 x 1½-in. county specification sewer rock, 1½ x ¾-in. and ¾ x ¼-in. concrete aggregate. The fourth product is concrete sand which is further washed and dewatered in a 30-in. spiral classifier. All concrete aggregates easily meet state specifications.

● The expansion program will be complete with the addition of a permanent crushing section

Please turn page

NEW WASHING PLANT can produce 100 tph. of spec material. Crusher section was eliminated to lower initial plant cost

PORTABLE PLANT KEYS EXPANSION

continued from page 73

FEED FOR WASHING PLANT is drawn from 15,000-ton stockpile (right) of minus 2-in. material. When stockpile gets low, portable crusher is moved back to replenish it

AFTER SCREENING, sand is further washed and dewatered in a 30-in. spiral classifier. Temporary wooden trough will be replaced by permanent underground piping

PORTABLE CRUSHER does double duty, providing material for both a hot-mix plant (rear) and a washing plant. When sufficient material has been crushed, it is moved to replenish washing plant's 15,000-ton surge pile

for the washing plant. This will free the portable for full-time duty moving around to produce base or hot-mix aggregates, either in the pit or at the job site.

The permanent crushing section will have a 4-ft. cone crusher, an additional screen, and a conveyor to return oversize to the crusher. Additional facilities will also be provided to produce a second grade of sand. The completed plant will have a capacity of 150 tph. and produce six sizes of specification products.

"We already have the additional screen, and hope to install the crusher and conveyor this fall," says George Richardson, looking to the completion of an orderly expansion program. The plant will be in a good position to bid for its share of area construction contracts, including a large flood-control dam, a major freeway and a $117-million reservoir—all in its market area. **END**

MAJOR EQUIPMENT REFERENCE

Shovel, ¾-cu. yd.	Harnischfeger Corp.
Quarry haul trucks (2)	Koehring Co.
Dozers (4)	Caterpillar Tractor Co. International Harvester Co.
Front end loaders (2)	Frank G. Hough Co. Mixer-Mobile Mfg. Inc.
Scalping screen, 3½ x 12-ft.	Nordberg Mfg. Co.
Portable crushing & screening plant	Austin-Western Construction Equipment Div.
Generator	Caterpillar Tractor Co.
Spiral classifier, 30-in.	WEMCO, Div. Western Machinery Co.
Conveyors	Western Machinery Co.

A SCALPING SCREEN removes cobbles from crusher feed. There is a ready market for this material

"The production of material designed to be placed upon interstate highways and upon structures in rivers carrying interstate commerce must be held to be production of 'articles for transportation'"

Aggregate producers *are* in interstate commerce

by Albert W. Gray

QUARRY EMPLOYES are engaged in the production of goods for commerce; hence, they are entitled to the overtime wages provided by the Fair Labor Standards Act. The United States Court of Appeals recently upheld this decision in a case involving the Federal Department of Labor versus a Missouri quarry owner.

At this quarry in Missouri, workers were engaged in quarrying and crushing rock and in the production of rock and oil mat aggregate. None of this rock, however, is shipped outside the state, while a large proportion is used on state roads and in maintaining dykes and revetments on the Missouri River.

By this section of the Fair Labor Standards Act it is provided, "Except as otherwise provided in this section, no employer shall employ any of his employes who is engaged in commerce or in the production of goods for commerce for a workweek longer than forty hours, unless such employe receives compensation for his employment in excess of the hours above specified at the rate of not less than one and one-half times the regular rate at which he is employed."

It was contended by the quarry owner that the production of crushed rock within the state for the maintenance and improvement of roads and a river over which interstate commerce moves is not the production of goods for commerce within the meaning of this statute.

Unfortunately for the quarry owner, however, the defense failed to meet all the demands made by the statute. Several years ago in its decision of a case of this character, the United States Supreme Court said of this paragraph of the statute and the words "engaged in commerce or in the production of goods for commerce," that the test of whether the employe is in commerce is obviously more exacting than whether his occupation is necessary to production for commerce.

This the court, in its decision of the quarry employe case, supplemented with a reference to a further decision of that court—that this section of the law does not require the employe to be directly engaged in commerce among the several states.

"This does not require the employe to be employed even in the production of an article which itself becomes the subject of commerce or transportation among the several states. It is enough that the employe be employed, for example, in an occupation which is necessary to the production of a part of any other articles or subjects of commerce of any character which are produced for trade, commerce or transportation among the several states."

In basing its conclusion that these quarry employes were within the provisions of the statute, on this statement of the law, the court added, "We feel that the production of material designed to be placed upon interstate highways and upon structures in rivers carrying interstate commerce must therefore be held to be production of 'articles for transportation.'

"This seems all the more reasonable when construed in the light of the Supreme Court's declaration that the phrase 'production for commerce' is 'obviously more flexible and more inclusive' than the phrase 'engaged in commerce' and in the light of the purpose of the Act itself.

"The Fair Labor Standards Act was designed to extend the frontiers of social progress by insuring to all our able-bodied workingmen and women a fair day's pay for a fair day's work. Any exemption from such humanitarian and remedial legislation must therefore be narrowly construed, giving due regard to the plain meaning of the statutory language and the intent of the Congress."

The case referred to is Tobin V. Johnson, 198 Fed. 2d 130, Missouri. END

Belt conveyor systems span gap between primitive and modern mining methods to supply United States and European consumers

Dominican gypsum leaps into world spotlight

A GYPSUM DEPOSIT OF FABULOUS SIZE has been brought into full-scale production in the Dominican Republic. More than a billion tons of solid gypsum rock cap the jungle-clad hills between La Lista and Angostura, twenty miles from the port of Barahona on the island's southwestern coast. There, government geologists collaborated with Bestwall Gypsum Company mining engineers to block out the deposit.

For years, primitive mining methods had nibbled away at the exposed fringes of the mammoth lode to supply rock for the local cement industry. Broken gypsum was laboriously manhandled into trucks, leaving fines and oversize to be trampled into the jungle mire together. The trucks discharged directly into mine cars for the trip out of the mountains to the sea coast.

Once at the port, a pair of traveling gantry cranes took over the chore of unloading gypsum from the cars into ships or into storage piles. The big cranes with their clamshell buckets found it to be a tedious chore to unload the small cars; a great deal of material was left in them to shuttle endlessly between the mine and port. Shiploading was scarcely more effective as the slow-moving gantry cranes trundled around an oval track to reclaim gypsum from storage piles into ships, bucket by bucket.

But with million-ton contracts in hand from Bestwall and other American and European gypsum users, these primitive methods were too cumbersome even for somnolent Latins. The prospective purchasers encouraged the republic's Department of Development to form a company to develop the property. Sal y Yeso Dominicanos C por A (Salt and Gypsum Co.) proceeded with remarkable determination and energy to invest in a modern, high-capacity materials handling installation that now speeds the flow of gypsum from mine to shiphold.

First work in the development was to expose the 125-ft. deep gypsum bed with crossroads every 300 ft. These branch off a main pioneer road running down the crest of the ridges and provide access for diamond drilling crews.

At the quarry face, 3½-in. diam. holes about 35 ft. deep are drilled on 5-ft. centers in a diagonal pattern. Usually, about 40 to 50 holes are shot at one time using ammonium nitrate. Since the gypsum is extensively folded and fractured, blasting produces some blocky oversize. This is then drilled by hand and shot with small charges of dynamite.

The development has two phases: One is a 400-tph. crushing and rail-car loading system at Las Salinas; the other, a stockpiling and shiploading system at Barahona to put gypsum into ship bottoms at better than 750 tph.

High-speed belt conveyors play the most important part in these materials handling systems. A long downhill conveyor hauls sized gypsum directly from the primary screen to a 600-ton surge pile ahead of rail-car loading. A wide, relatively short conveyor takes gypsum rock from a pair of 3½ x 5-ft. vibrating feeders to the rail cars. These cars are loaded continuously as they move slowly beneath a two-leg loading chute. No rock is spilled between the cars as an operator flips a gate in the top of the chute to divert the flow from a full car to the empty one that follows.

Gypsum is delivered to the conveyor system by trucks that haul the blasted rock from the mine face to a truck dump hopper. An apron feeder puts the mine-run rock on a small vibrating grizzly to scalp off oversize for a 30 x 42-in. primary jaw crusher. Normally, this cut is made between 4 in. and 6 in., depending on the needs of the ultimate user. Through-grizzly gypsum is dropped to a vibrating screen to take out minus ½-in. fines which

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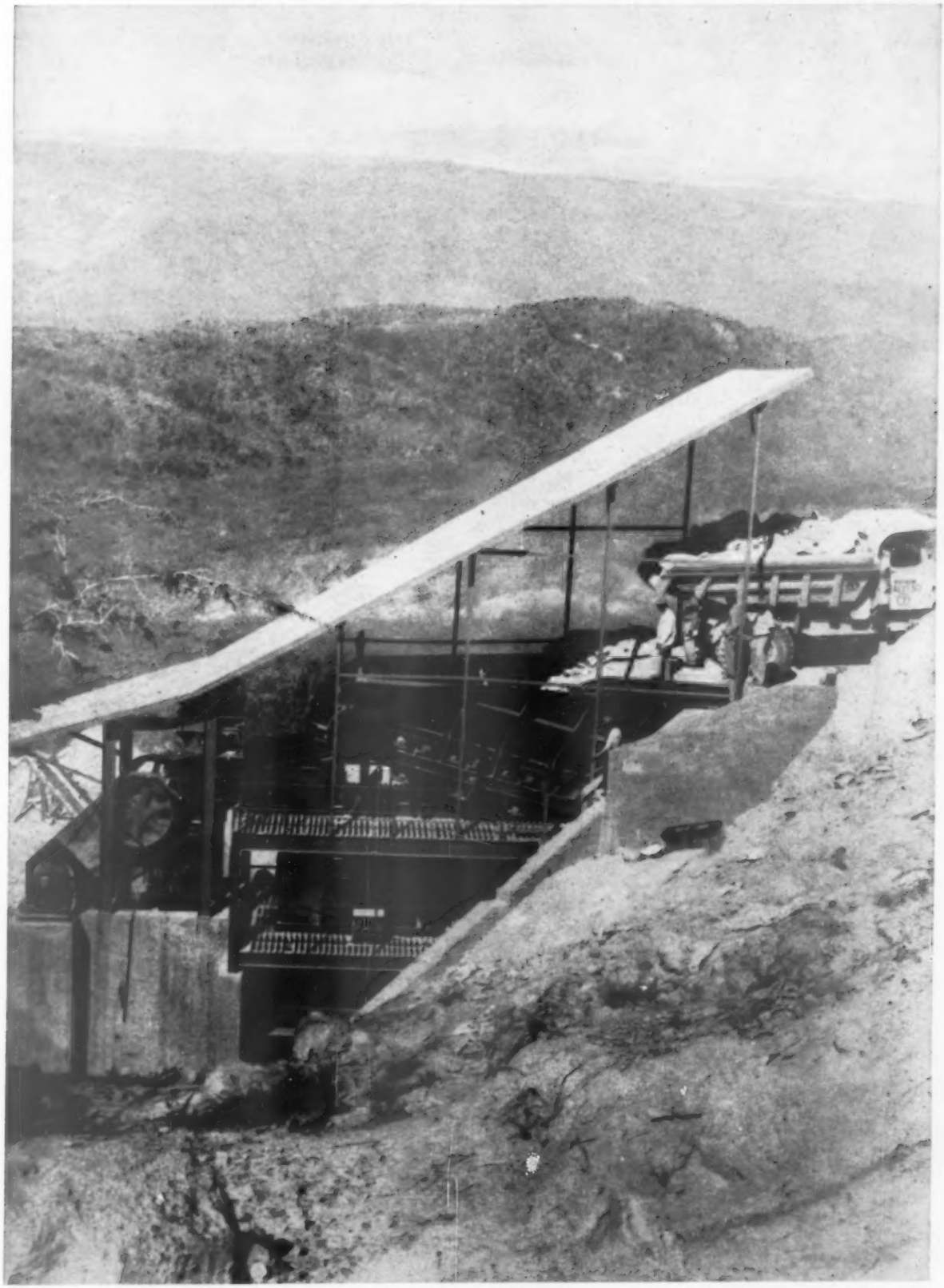
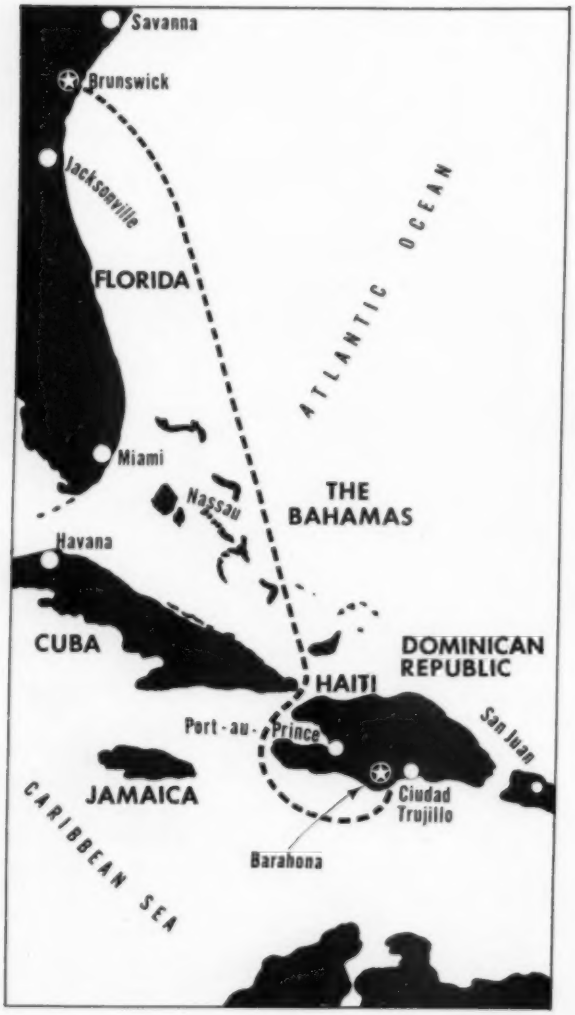


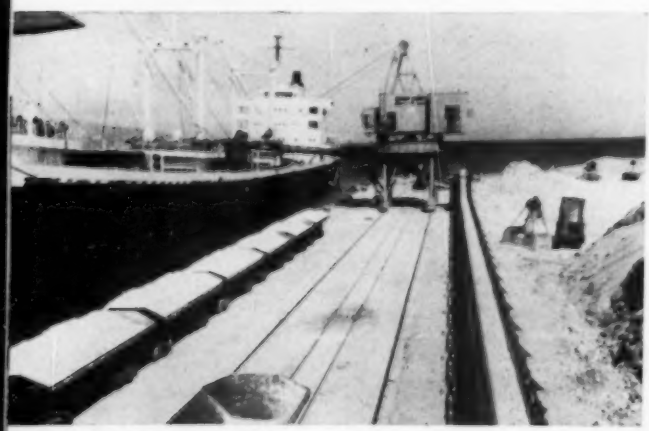
PRIMARY CRUSHING SYSTEM is cut into brow of a mountain high above rail loading station

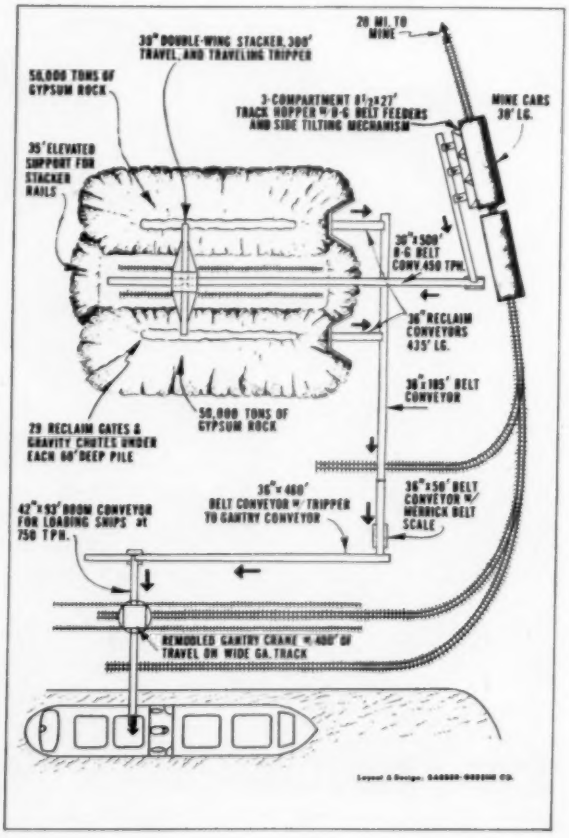
Mine & Quarry Engineering photo



THE RAIL LOADING STATION was cut into solid gypsum. This debris was hauled 20 miles to the port of Barahona to be used as fill under the stacking conveyor *Barber-Greene photo*

A TRAVELLING GANTRY CRANE has been remodeled to support a stacker boom to load ships at a rate of 750 tph. *Barber-Greene photo*




20 MI. TO MINE
35" DOUBLE-WING STACKER, 300' TRAVEL, AND TRAVELING TRIPPER
50,000 TONS OF GYPSUM ROCK
3-COMPARTMENT 81'x27' TRACK HOPPER W/ 8-G BELT FEEDERS AND SIDE TILTING MECHANISM
MINE CARS 30" LG.
35' ELEVATED SUPPORT FOR STACKER RAILS
36"x509' 8-G BELT CONV. 450 TPH.
36" RECLAIM CONVEYORS 435' LG.
36"x185' BELT CONVEYOR
50,000 TONS OF GYPSUM ROCK
29 RECLAIM GATES & GRAVITY CHUTES UNDER EACH 60' DEEP PILE
36"x480' BELT CONVEYOR W/ TRIPPER TO GANTRY CONVEYOR
36"x50' BELT CONVEYOR W/ MERRICK BELT SCALE
42"x93' BOOM CONVEYOR FOR LOADING SHIPS at 750 TPH.
REMODLED GANTRY CRANE W/ 400' OF TRAVEL ON WIDE GA. TRACK

continued from page 77

are discarded. The 4 x ½-in. rock goes downhill nearly 600 ft. to the surge pile. Drive machinery of this 30 in. x 566-ft. belt conveyor is arranged to put energy back into the electrical system where it powers other equipment.

Oversize through the primary crusher is conveyed to a secondary crusher. Here a 4 x 7-ft. grizzly drops fines to the downhill belt and shoots the oversize to a 24 x 50-in. single roll crusher. The products from this crusher join the flow of material on the belt conveyor to the surge pile.

The port installation is also completely tooled with belt conveyors. First units in the system are three short-belt conveyors that pull material out of a shallow, three-compartment track hopper. Each is rated at 150 tph. and discharges to a gathering belt, first leg of the trip to storage piles.

This shallow track hopper was the ingenious answer to the problem of water only a few feet below grade. The hopper was designed with three 8½ x 8½-ft. compartments and a retaining plate to prevent material from flying out as the heaped mine cars are side-tilted into the hopper.

A double-wing stacker of giant proportions builds two storage piles of gypsum rock. With its two 62-ft.-long booms, it slowly travels on its wide gauge track to build storage piles about 60 ft. deep and 300 ft. long, each holding about 50,000 tons of material. The stacker diverts the flow of rock brought to it on a 500-ft. long belt conveyor that gets its rock from the conveyor above.

Even the elevated base that supports the stacker is made of gypsum to prevent contamination at the toes of the storage piles. This pile was built about 35 ft. above grade using material salvaged from the access roads and rail cuts into the gypsum hills around the mine at Las Salinas.

Each of the big piles has a reclaim tunnel with 29 gravity chutes above a reclaim belt conveyor. While each 36-in. conveyor could handle the maximum of 750 tph., the operators will try to draw down each pile uniformly using both conveyors. A cross-conveyor takes material from both reclaim units and loads it to a short weighing conveyor. Here, a belt scale with totalizer measures the amount of gypsum sent to the dock and its results determine Sal y Yeso's revenue from each shipment of gypsum.

A long belt conveyor travels the length of the dock, about 460 ft. It is equipped with a traveling tripper to put rock on a shiploading conveyor supported by one of the traveling cranes.

Here, again, the ingenuity of the designers is apparent. The shiploading conveyor boom is mounted on one of the old gantry cranes. This monster provides plenty of stability to support the conveyor while its generator supplies power to raise or lower the conveyor boom and to trundle the tripper assembly along the dock. Slow speed is no obstacle, since it only moves between one hatch and the next when loading a ship, pulling the belt tripper as it goes. The wide-gauge gantry track runs about 365 ft. along the dock, but this travel will eventually be extended to about 400 ft.

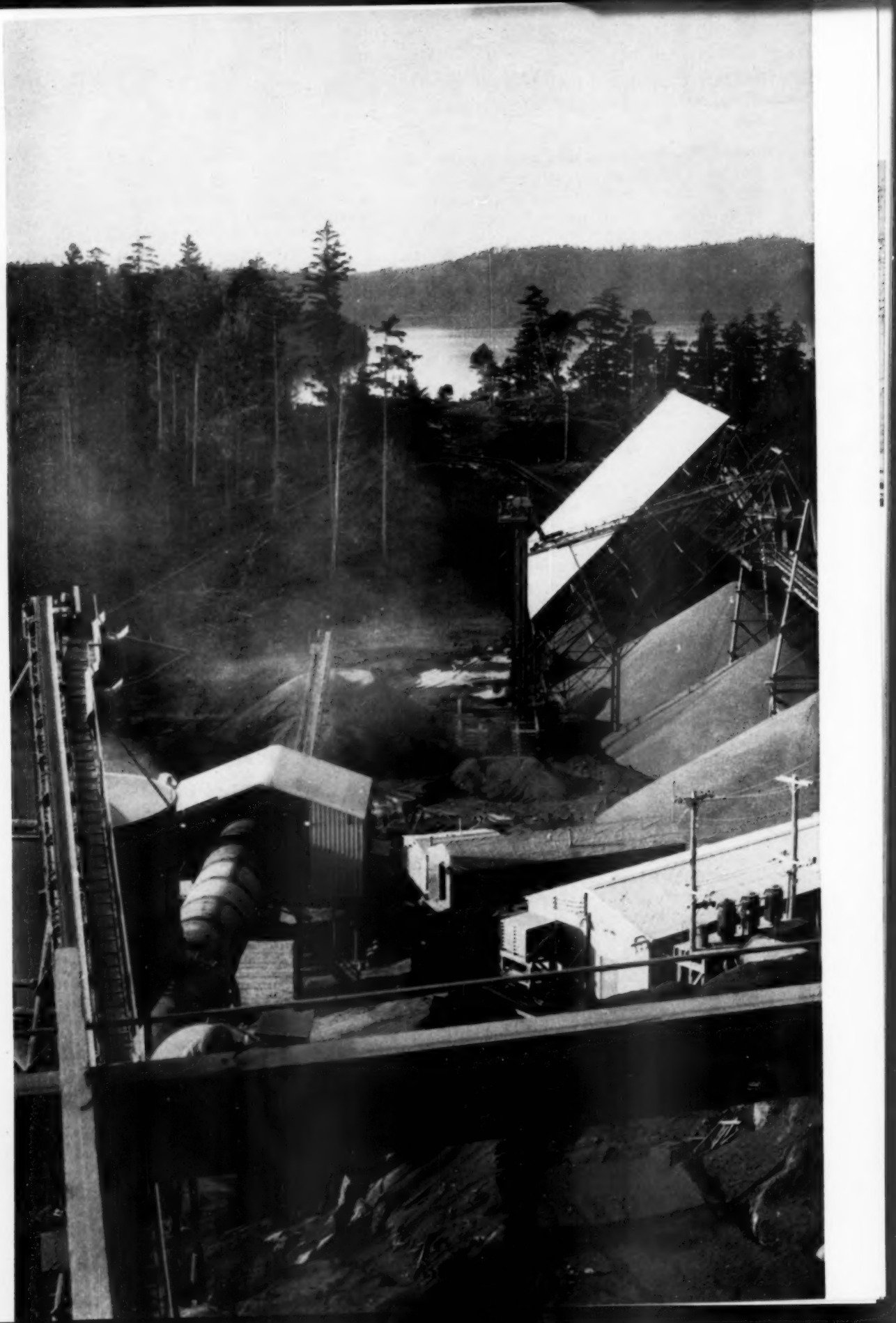
■ *This gypsum deposit is in a strategic position to supply material to gypsum board producers in the southern part of the United States. It is many sea miles closer to these ports than the nearest seaboard gypsum in Nova Scotia*

The gantry boom can be folded almost tight against the crane to assure clearance when a ship is warping into position at the dock. Then the conveyor is lowered into position to spout material into the holds. At the end of the conveyor is a motorized swinging chute that directs the flow of gypsum into remote corners of the hold. This is an important advantage over the use of clamshell buckets, since it required a great deal of skill for the operators to trim the ship properly.

This gypsum deposit is in a strategic position to supply material to gypsum board producers in the southern part of the United States. It is many sea miles closer to these ports than the nearest seaboard gypsum in Nova Scotia. At the same time, it has the advantages of warm-weather mining and transportation all year 'round. END

MAJOR EQUIPMENT REFERENCE

At The Mine:	
Shovel, 2½-cu. yd.	Northwest Engineering Co.
Drill & Compressor	Chicago Pneumatic Tool Co.
Quarry trucks, (4)	Euclid Div., GMC
Apron feeder, 3½ x 16-ft.	Smith Engineering Works Div., Barber-Greene Co.
Vibrating screen, 5 x 10 dd.	Smith Engineering Works Div., Barber-Greene Co.
Jaw crusher, 30 x 42-in.	Smith Engineering Works Div., Barber-Greene Co.
Vibrating grizzly 4 x 7-ft., secondary	Smith Engineering Works Div., Barber-Greene Co.
Vibrating grizzly, 4 x 8-ft.	Nordberg Mfg. Co.
Secondary crusher, 24 x 50-in.	Penna. Crusher Div., Bath Iron Works
Vibrating feeders, 3½ x 5-ft.	Jeffrey Mfg. Co.
Belt conveyors, (4)	Barber-Greene Co.
At Barahona:	
Belt weighing scale	Merrick Scale Mfg. Co.
Motors and electrical equipment	Westinghouse Electric Corp.
Car dumping mechanism	Sal y Yeso Dominicanos
Track hopper and feeders, (3)	Barber-Greene Co.
Double wing stacker	Barber-Greene Co.
Shiploading boom	Barber-Greene Co.
Belt conveyors, (7)	Barber-Greene Co.
Layout and design	Barber-Greene Co.



Remote Saturna Island achieves commercial fame with lightweight aggregates from northwest markets

Choice shales fire to premium aggregates

by Ralph S. Torgerson

THERE'S A NEWCOMER—Saturnalite—in the select circle of lightweight aggregates formed by Idealite, Materialite, Basalite and Rocklite. All are premium-quality expanded aggregates, fired by rotary kilns and derived from the handful of choice clay or shale deposits across the continent. Tough and vitreous on the outside and porous inside, these kiln-fired pellets impart properties of lightness and strength to the ready-mixed concrete and concrete products made with them.

For example, Saturnalite, newest member of the family being introduced by British Columbia Lightweight Aggregates, Ltd., has the following weights per cu. ft. in each of its five production sizes:

1 x $\frac{9}{16}$ in.	—27 lb. per cu. ft.
$\frac{9}{16}$ x $\frac{3}{8}$ in.	—36 lb. per cu. ft.
$\frac{3}{8}$ in. x No. 4	—41 lb. per cu. ft.
No. 4 x No. 8	—55 lb. per cu. ft.
Passing No. 8 mesh	—68 lb. per cu. ft.

A bright future is predicted for Saturnalite which, because it is so hard, is water resistant. Shrinkage is reduced in block or poured concrete, and outstanding strengths are achievable while weights are kept to a minimum.

Typical concrete block made with Saturnalite weighs about 23.9 lb., and its strength averages about 1,470 psi. Drying shrinkage is averaging around .042 of 1 percent, but some block have been as low as .031 percent. This low shrinkage can be directly attributed to low adsorption of the coated aggregate particle.

Accounting for the tough, glossy surface of Saturnalite and the other expanded shales mentioned is the fact that they are used as they come from the kiln—no final crushing is necessary or desirable. They bloat in the firing zone and form round, evenly sized pellets that remain separate after cooling. Screening alone is needed to finish the process.

Saturnalite is turned out at a rate of 400 cu. yd. a day at a plant situated atop an almost inexhaustible supply of excellent shale. The deposit is located on Saturna Island in the Gulf of Georgia; it is close to major markets in the United States and Canada. By low-cost barge shipping, Bellingham, Wash., is only 28 miles away; Vancouver, B.C., 32 miles, and Seattle, Wash., 79 miles.

Saturna Island was roused from isolated slumber by the completion of this modern plant on its shores. So primitive was it formerly that no source

Please turn page

LEFT: Timbered hills on Saturna Island give way to kilns and storage sheds for "Saturnalite"

RIGHT: A virtually inexhaustible supply of shale supplies the raw materials for British Columbia Lightweight Aggregates' new plant

continued from page 81

of power was available. To keep the operation going around the clock, a powerhouse had to be built. The powerhouse was designed for continuous service, with the provision that one of its three diesels always be free for servicing.

During the day shift, when all plant components are operating, two diesels are needed. Each drives a 200-kva. generator. But during the night and graveyard shifts, when only the kiln and cooler are running, one diesel-electric unit is used.

Plant components were patterned in many ways after the Basalt Rock Co. plant at Napa, Calif., and the Rocklite Products plant at Ventura. Both companies provided technical assistance with design. But, although it is like other plants in many ways, the Saturnalite plant has some striking differences. They stem chiefly from its geographic location, and concern storage and shipping facilities.

Barges coming alongside the wharf take aggregates on board from an "elephant trunk" hanging from a loading boom. The boom is cantilevered 70 ft. above mean water level and can be raised or lowered to suit either the size of the barge or the height of the tide. The channel is deep enough to take any of the available barges.

Also, oil barges arrive at the same wharf to transfer their cargo—Bunker C oil for the kiln and diesel fuel for the generators. The oil is pumped into a 100,000-bbl. tank; the fuel, into a tank at the powerhouse.

Nine men operate the plant during the day shift, including superintendence and maintenance. At other times, a burner and helper do the job. No more are needed then, because the powerhouse and the shale supply to the kiln are automatic.

How is Saturnalite produced? Processing starts at the deposit where shale is as easily removed as it is plentiful. Beds range from 200 to 300 ft. thick, and tip upward at a 45-deg. angle, needing virtually no stripping. The small amount of overburden is bulldozed aside with a tractor.

The top layers of the shale are quite soft, and are excavated by a bulldozer equipped with a hydraulic back-ripper. Later, as work goes deeper and the shale becomes harder, a back-ripper will be used. As the material is broken up and windrowed, it is loaded into a 10-cu. yd. tandem truck with a 1-cu. yd. shovel.

The tandem is usually needed for haulage, because a single-axle unit cannot get the necessary traction in the soft material. This becomes a big problem as the shale weathers and breaks down; therefore, single-axle trucks can be used only during extremely dry, summer weather.

It takes about 8 min. to complete the hauling cycle from the deposit to the crusher 1,000 ft. away. The shale is dumped into a 30-cu. yd. hopper

RAW SHALE must be crushed and screened before it goes to the kiln to be fired

which feeds continuously into a hammermill. The initial crushing operation sends material on a belt conveyor to a 60-ft. tower for screening. Passing over a two-deck screen, shale is separated into minus ¾-in. and minus $\frac{5}{16}$-in. sizes. Oversize from both decks, or any portion of the coarse size, may be returned to a secondary crusher—a double-rotor, high-speed hammermill.

Two routes are taken by the screened shale: It goes directly to the coarse or fines stockpiles, or is by-passed directly into a hopper for conveying into a kiln-feed "day" bin. This bin, with a 250-cu. yd. capacity, holds enough shale to keep a constant feed to the kiln for about 15 to 16 hr. of operation. A vibrator at the bottom of the bin keeps the shale from clogging.

If the bin is not fully charged during the crushing period, a front-end loader loads raw material from the stockpiles into the feed hopper for conveying to the kiln-feed bin.

In the continuous, automatic process, shale is conveyed from the bin into the feed end of the 10 x 120-ft. rotary kiln which discharges into a 6½ x 90-ft. rotary cooler. It takes the shale about 40 min. to go through the kiln, which rotates at 1.2 rpm., and about 55 min. to go through the cooler. Then it drops onto a belt conveyor which takes it to a "ready" or surge stockpile. The cooler is long enough so that the properly expanded shale does not require water sprays that subject it to the shock of sudden cooling.

Underneath the ready stockpile is a 7-ft. diam., wood-stave reclaiming tunnel. A conveyor moves the shale to a 60-ft. bucket elevator for transfer to a horizontal stockpiling belt conveyor leading to the finished-product storage building.

The peaked roof of the storage building shelters the conveying equipment and finish screens. The lightweight shale is taken by belt conveyor and placed over a triple-deck screen, then over single-deck screens. The five finished aggregate sizes remain in the 125-ft. span building until needed for barge loading. Then they are removed by a conveyor p'aced in another 7-ft. diam. reclaim tunnel and taken uphill to the loading station. **END**

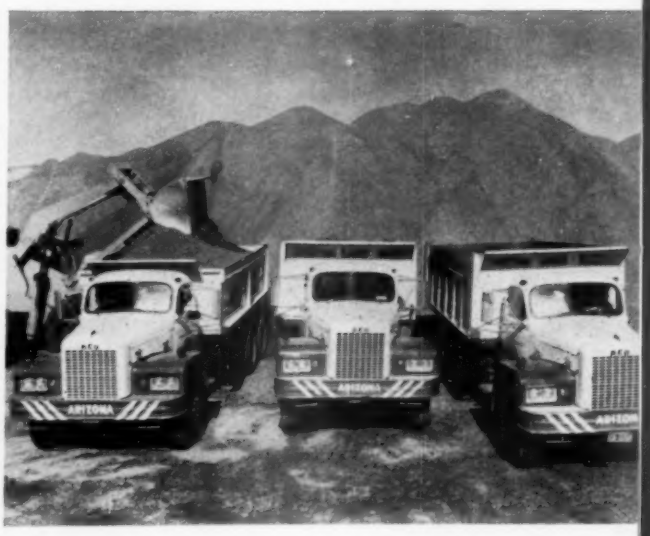
MAJOR EQUIPMENT REFERENCE

Tractor, D-9	Caterpillar Tractor Co.
Screens	Link Belt Ltd.
Front-end loader, 2½-cu. yd.	Trojan Div., Yale & Towne Mfg. Co.
Shovel, 1 cu. yd.	Northwest Engineering Co.
Crushers:	
Primary Hammermill	Jeffrey Mfg. Co.
Secondary Hammermill	Miller Equipment Co.
Vibrator on kiln-feed bin	Syntron Co.
Rotary kiln, 10 x 120-ft.	Traylor Engineering & Mfg. Co. Div.
Cooler, 6.6 x 90 ft.	Fuller Co.
Oil burner, No. 786	Hauck Mfg. Co.
Tandem truck, 10-cu. yd.	General Motors Corp.
Plant design	Hill, Starck & Associates

HEART of the new plant is the kiln and its cooler that turn out the "hardshell" aggregate

Arizona Sand & Rock peps up delivery time, slashes maintenance, with automatic transmissions in truck fleet

Automatics lower truck expenses



THE use of automatic transmissions in heavy-duty trucks can cut maintenance costs more than 50 percent—apparently without an increase in gas consumption and at no higher initial cost. This has been the experience of the Arizona Sand & Rock Co., Phoenix, whose 47 trucks have been equipped with automatic transmissions over an 18-month period.

The reason the company gives for buying automatics was to relieve shock-load damage to truck transmissions that keep maintenance expenses high. A close look at AS&R's maintenance records reveals that stick-shift dump trucks and mixers cost close to $1,000 a year in repairs or replacement of equipment.

This includes work on drive-line and chassis components, engine and transmission repairs, universal joints and replacement of up to six axles per truck each year. Other engine maintenance, including clutch replacement and adjustments, brake relining, and repairing engine lugging damage, accounts for nearly $400 more. This boosts total

Please turn to page 86

ABOVE: When this delivery truck with an automatic transmission is loaded, it will barrel on its way without shifting gears

CENTER: Equipment Superintendent Ralph Greer checks his detailed truck maintenance records that show big savings for automatic transmissions on 47 of his trucks

BELOW: Fast get-away with trucks calls for rapid loading. Not a minute is wasted to speed aggregates on their way to the user

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STOODY SEMI-AUTOMATIC WIRES *are available in a wide range of alloys for application through most standard semi-automatic welding machines.*

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AUTOMATICS LOWER TRUCK EXPENSES

continued from page 84

annual maintenance expense for each truck with conventional shift to almost $1,400.

Transmission repairs to the automatics have averaged only a little more than $200 per unit during the year. "However," Ralph Greer, equipment superintendent, cautions, "to be really fair you've got to remember that none of our automatics is more than a year and a half old, while some of our stick shifts are real veterans. Probably an accurate estimate of maintenance savings using the automatics would be 50 to 60 percent. But with 47 units that really mounts up."

Maintenance plays an important role in Arizona Sand & Rock's extensive operations. Sixty-five men work full time on vehicle maintenance in its well-equipped shops. The company does all its own work except highly specialized jobs.

To keep all equipment on the road, servicing and fueling crews work two shifts and mechanics work around the clock. This extra maintenance effort results in better utilization of equipment.

There is no question about the over-all superiority of the automatics in Mr. Greer's mind. "They keep the motor running at the right rpm.—one that pulls the load properly. An engine performing continuously at the proper rpm. has a much longer life. From the radiator on back, our automatics have proved that they save engine wear."

Fuel consumption is about the same for both types of transmission. "In addition," continues Mr. Greer, "trip time with the automatics has been reduced almost 25 percent. This not only saves us money, but results in better service for our customers. This is important to us."

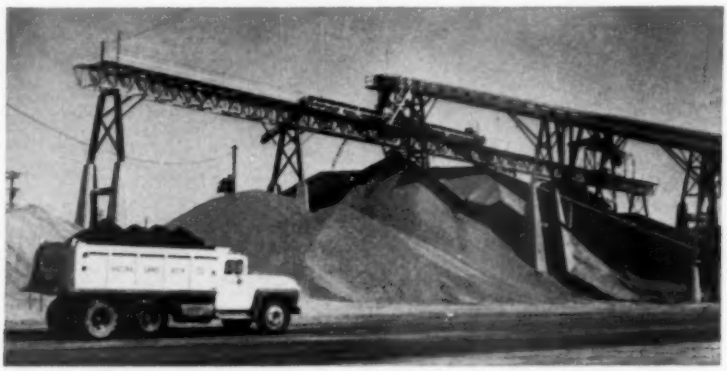
To carry out its extensive aggregate, ready mix, and paving business, Arizona Sand & Rock maintains one of the state's largest truck fleets—more than 240 vehicles. Since late 1958 all new trucks have been equipped with automatic transmissions.

How do automatics stack up with the mechanics? "They're more complicated than conventional transmissions but I'd rather work on the automatics," said Mechanic Ken Leithleiter. The drivers apparently feel the same way, according to Cal Bryant, dump truck foreman.

MAJOR EQUIPMENT REFERENCE

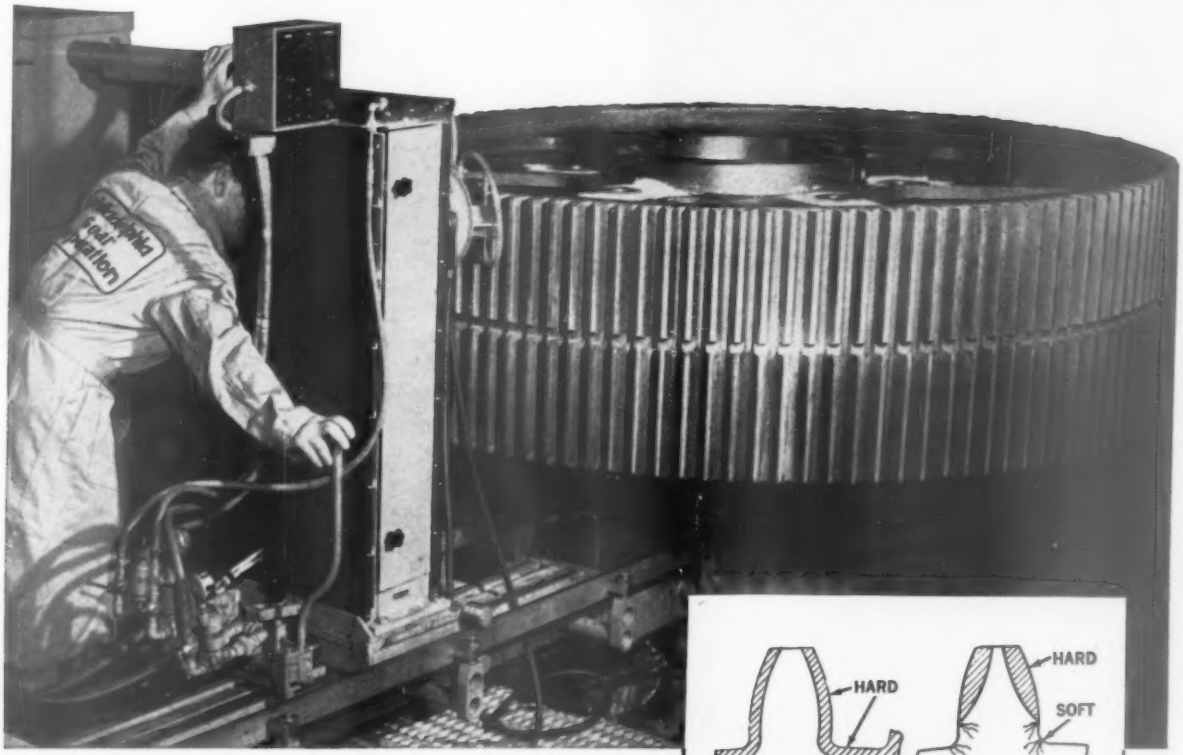
Truck chassis (33)	Reo Div., White Motor Co.
Truck chassis (14)	Ford Motor Co.
Automatic transmissions (47)	Allison Div., GMC

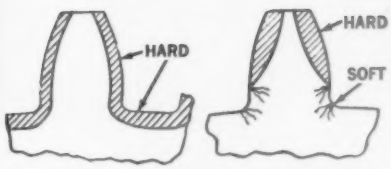
A FAST, efficient storage system keeps production in step with accelerated shipping schedules at Arizona Sand & Rock



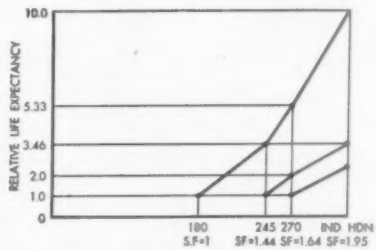
LAST STOP in the plant is at the scale house. This is another place where the truck's smooth acceleration pays dividends

New Philadelphia induction hardening increases life of large gear drives . . .





New Philadelphia full contour induction hardening (left) provides a continuous hardened area from one tooth flank around the root and up the other flank without interruption. There are no points of stress. Typical heat treated gear (right) shows inadequate hardening of root of tooth, a point of major stress.



This chart shows the relationship between load and gear life. Note that the improved service factor of a gear set may be used to substantially increase gear life, rather than to increase the load.

HERE'S WHY: Full tooth contour induction hardening of large gears provides a uniformly hardened surface from one tooth flank around the root and up the other flank without interruption. Eliminates points of thermal stress concentration. And there is no distortion, a problem of heat treated gearing that requires subsequent grinding.

This new, advanced Philadelphia method permits radical reduction in sizing and/or increased load carrying capacities. And it can easily harden even the largest spur, helical and herringbone gearing up to 180 inches in diameter, 20 inches in face, and 3/4DP.

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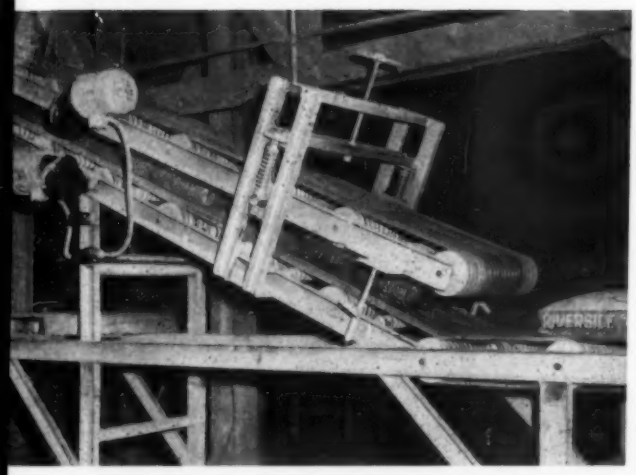
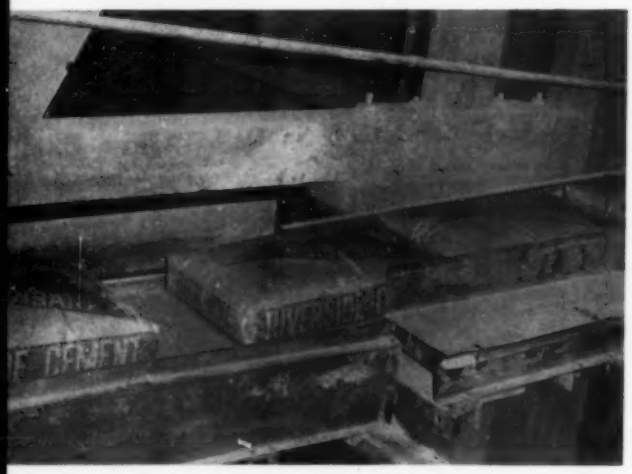


FILLED BAGS drop from 150-FC packer to take-away conveyor and are conveyed to inclined bag flattener which flattens and shapes package



INVENTORY CONVEYOR and feeder conveyor permit accumulation of bags prior to automatic palletizing

ACCELERATOR CONVEYOR controls spacing of bags for pattern forming. Automatically controlled bag turner changes bag travel direction to suit pattern needs

Automatic palletizing invades the packhouse

AUTOMATIC PALLETIZING of bagged cement is a major break-through for materials handling in the cement industry. It will possibly become standard practice here as it has been for several years in other industries.

The first to put in the system is the Crestmore, Calif., plant of Riverside Cement Co., a division of American Cement Corp. The recently completed packhouse modernization included an automatic palletizing system as well as new bag packing equipment, a complete bag conveyor system and a remodeled shipping dock.

Years of study of various bag packing systems for a cement plant led up to the company's decision to modernize its Crestmore plant. Riverside's former system of cement packing and loading was a high cost operation. Of great concern to the company, too, was the delay involved in filling their customers' orders. Riverside not only wanted an answer to this immediate problem, but wanted to prepare for a sharp increase in demand for palletized shipments.

The cost of hand-palletizing deterred the company from taking advantage of the material handling economies of palletized deliveries for several years. But when customers began to state a preference for receiving, storing and distributing bagged cement on pallets, Riverside decided to supply this type of package. An extensive market survey found that nearly 50 percent of Riverside Cement's customers would like to receive shipments on pallets—either immediately or within a year's time. *Please turn to page 92*

Another reason for the superiority of

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KENNEDY has taken the *GUESSWORK* out of Rotary Kiln design by use of a modern digital computer to determine . . .

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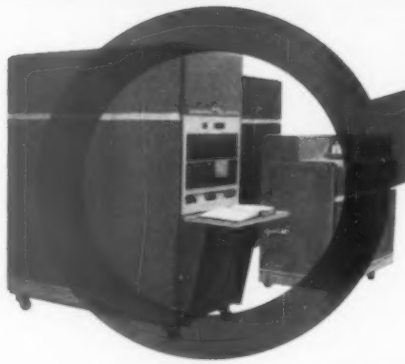
- **FIRING EFFICIENCY**
- **OPTIMUM DIMENSIONS**
- **REFRACTORY REQUIREMENTS**
- **AUXILIARIES & CONTROLS**



IBM 650 Data Processing System used by KENNEDY Engineers for Rotary Kiln Calculations.

KENNEDY takes the *more than 100 variables* in a kiln operation and in less than an hour solves the basic equations necessary to determine optimum design.

KENNEDY's already established reputation in kilns for . . .

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. . . is further enhanced by this new, more scientific approach.

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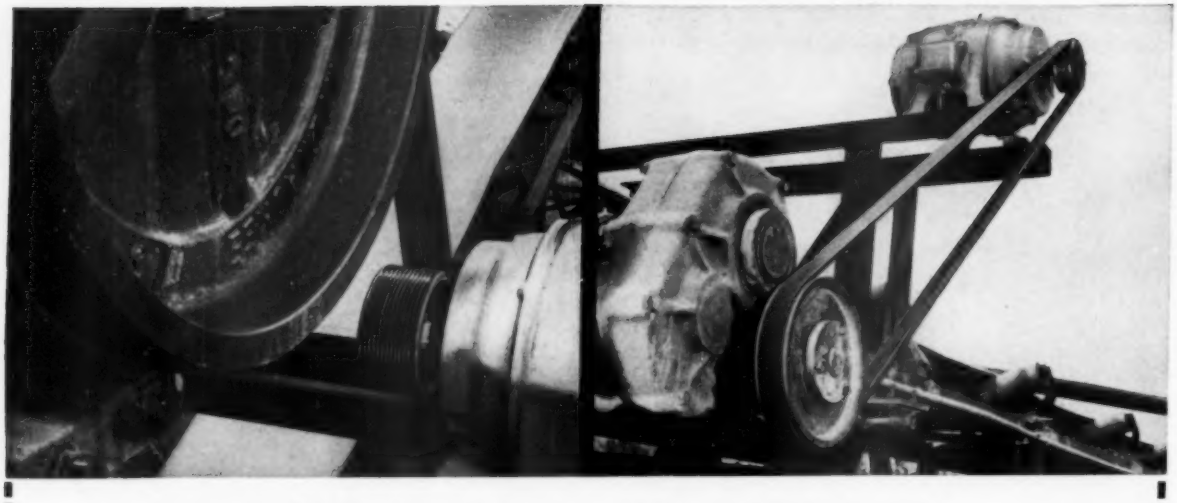

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Power to spare is delivered by these R/M Poly-V Drives to assure trouble-free operation of the belt conveyors made by Lippman Manufacturing Company for an aggregates plant. Here's why. Poly-V Drive design provides greater horsepower capacity—delivers more power per inch of drive width than ever before possible with conventional multiple belt drives.

Poly-V features a *single* unit V-ribbed belt across full width of sheaves with mating grooves. It is not an assembly of V-belts. Single unit belt design eliminates belt length matching problems. These conveyors thus operate with minimum downtime and belt replacement costs . . . run cooler, smoother under *all* drive loads.

Just two cross sections of Poly-V Belt meet *every* heavy duty power transmission requirement. Ask your R/M Distributor for details about R/M Poly-V* Drive for your application.

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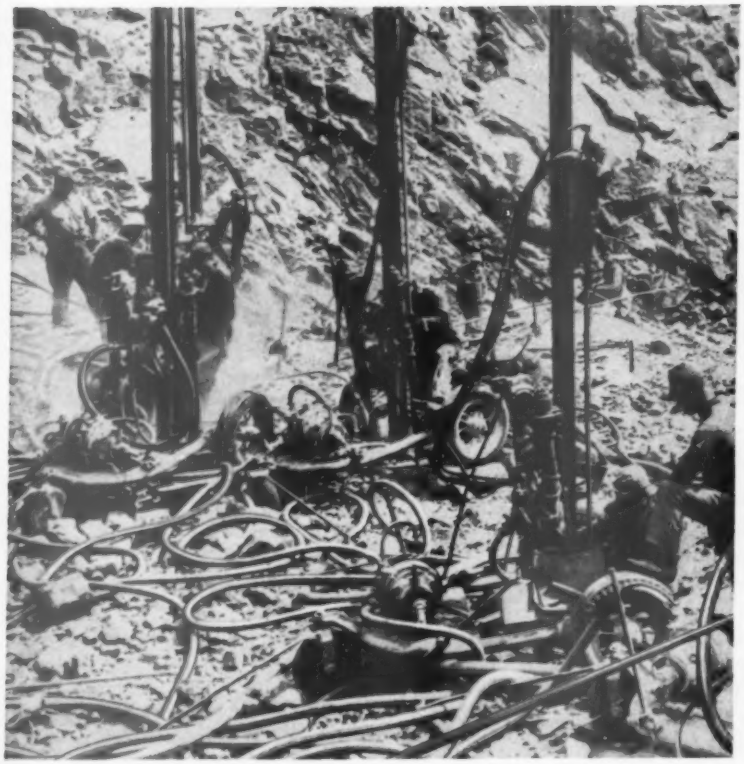
Engineered for 45° Idlers

- TRAINS NATURALLY
- TROUGHS DEEPLY
- HOLDS FASTENERS
- RESISTS IMPACT AND RIPPING
- REQUIRES NO BREAKER PLY
- DOUBLE COMPENSATION RELIEVES OUTER PLY STRESS
- EXCLUSIVE "XDC" LONG-WEAR COVER

Every component of a Ray-Man Conveyor Belt is *precision proportioned* to give you a balanced belt construction, with as much as ⅓ longer life expectancy. It's the same as getting ¼ more conveyor belt for your money. Further savings are possible, if you use 45° Idlers. Properly engineered, you can haul a fuller load, or install a narrower conveyor. Ray-Man is guaranteed against ply or cover separation at the hinge line where the 45° angle proves too sharp for regular belt constructions. Write for Bulletin M303.



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more flexible, weighs less than any hose for equal pressure

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Strong, lightweight, and "flexible as a rope"—Homoflex is the easiest handling hose and lasts longer. Made in types for air, water, other fluids and gases. Ask about other types of R/M rubber hose for your job applications. Write for Bulletins M620 and M694.

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AUTOMATIC PALLETIZING INVADES THE PACKHOUSE

continued from page 88

A FULL PALLET is automatically discharged from the stacking machine at Crestmore

The new automatic pallet loader operates at a speed of 25 bags a minute with five bags to a tier. Selectors permit five to eight tiers to a pallet, depending on customer requirements. For a customer who has a 1½-ton fork lift, a 5-tier pallet load would be specified; for a 2-ton unit, the pallet could be stacked 8 tiers high.

Riverside feels that the new automatic pallet loading system will pay off. Now the company has a faster, smoother and cleaner bag packing, loading and shipping system. This gives faster and better service to customers with far less labor expense.

Riverside's customers save time by picking up palletized loads at the mill and in unloading at their own warehouses. They save time in making up and shipping out their own orders. In addition to getting more mileage out of warehouse space by multiple-tiering pallet loads, everyone has a quicker and more accurate means of inventory control. There has been much less breakage and clean-up expense.

Returnable wooden pallets are used for two reasons: They are compatible with the automatic pallet loader, and a higher charge to the customer is avoided.

The effectiveness of the new shipping system has exceeded expectations. Since starting operations with the new system in July, 1959, the company's palletized shipments have increased from 5 to 24 percent of bagged shipments. This percentage will probably increase to about 40 percent by the middle of 1960.

The new bag-packing system uses 2 packers, each capable of filling 24 bags a min. Eventually they may be able to install automatic valve bag applicators to step up this rate to 30 bags a min. The packing system with its capacity of 48 bags a min. was designed with emphasis on cleanliness of bags, better weight control and ease of handling.

After bags are filled, they are automatically discharged to the conveyor system. By pre-selecting the direction of each conveyor section, bags can be moved to any two of the plant's four loading terminals. As an integral part of the system, bags traveling to the automatic pallet loader pass through a bag flattener which shapes and squares off the package. This insures straight, even pallet loads. Flipping points in the conveying system assure that all bags arrive at the loading point with the printed side up.

Lift trucks pick up the pallets and carry them from the automatic loader to the shipping area for truck loading, or directly to the warehouse for storage. Delivery trucks now drive right into the warehouse and are loaded from either side.

When non-palletized shipping is called for, bags bypass the pallet loader and travel by overhead conveyor to the loading point on the truck bed. This conveyor is high enough to provide a drop to the truck bed so that a two-man crew can easily load the trucks.

For rail car loading, the bags are conveyed to a special flexible conveyor. This spring-type powered conveyor can make a 90-deg. turn so that its discharge point can be positioned anywhere in the car. Eventually it will be possible to ship palletized loads in rail cars as well as by highway trucks.

END

MAJOR EQUIPMENT REFERENCE

Automatic pallet loader	Lamson Corp.
Overhead conveyor system	Lamson Corp.
Bagging machines (2)	St. Regis Paper Co.
Flexible rail car conveyor	Power-Curve Conveyor Co.
Bag flattening machine	Power-Curve Conveyor Co.
Lift truck	Clark Equipment Co.
Layout and design	Riverside Cement Co.
	St. Regis Paper Co.
	Lamson Corp.

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HOW TO INCREASE CEMENT PRODUCTION UP TO 50%...

The capacity of an existing tube or compartment mill can be increased up to 50% or even higher simply by installing a Bradley Hercules Mill as a preliminary pulverizer on either the dry raw or finish side. Yet this increased production of cement raw material or finished cement is obtained at no increase in horsepower consumption per ton or barrel produced. The Hercules automatic electrical feed control eliminates manual operation. Rugged construction . . . dustless operation . . . easy accessibility to grinding parts keep maintenance costs at an absolute minimum. That's why so many in the cement industry rely on the Hercules Mill for increased production of finished material.

See Chemical Engineering Catalog or for complete information, write for Catalog No. 63

BRADLEY PULVERIZER CO. LONDON ALLENTOWN, PA. BOSTON

superior grinding equipment since 1891

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Crushing men are prime contractors on these road jobs

Here's how the West solves crushed rock shortage

by Pat Thomson*

A GREAT DEAL IS BEING WRITTEN about the problem of locating suitable deposits of aggregates for roadbuilding. This problem is not only one in thickly populated regions where prime resources face rapid depletion and restrictive zoning. It is shared by many of us in less crowded areas, even where acres of solid rock stare you in the face. This description applies to Douglas County, Wash., where I am county engineer.

We do have rock—miles and miles of blue basalt ledges that must be drilled, shot and crushed to the proper sizes. Every cubic yard of rock we use, from 6-in. ballast to ¼-in. screenings, must be produced by a commercial crushing contractor. But we just are not favored with accessible pitrun deposits that could be used as is or with little screening for selected roadway borrow and other bases.

This leads to a rather unusual situation. Since quantity of rock is generally the largest item on our bituminous surfacing projects, these jobs are bid by the crushing men as prime contractors. They, in turn, sublet the actual surfacing to some oiling outfit.

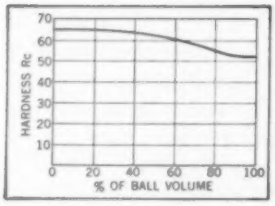
The D. A. Sullivan Co., of Spokane, Wash., has been one of the prominent and best bidders. In the contracts, we give the contractor a selection of pit sites provided by the county or the option of choosing his own site at his expense. Often we can use a heavy talus slope. However, in most cases, these are eliminated immediately because they contain a type of soil that is detrimental to the production of proper bituminous surfacing rock. And, since Douglas County has little water for washing, these slopes cannot be used.

Please turn to page 96

*County Engineer, Box 6363B, Route 3, Wenatchee, Wash.

QUARRIES run from 10,000 to 45,000 tons per location. Most of our rock is blue basalt, shot heavily to give an average fragment size of 8-in. diam. This material is moved to feeder and primary breaker by tractor equipped with a U-dozer

Immediate delivery on USS Grinding Balls We can ship immediately from stock as requested a range of sizes from ¾″ to 4″ in USS Carbon-Manganese and USS Alloy Steels. Here are three reasons why USS Grinding Balls should be specified: **Maximum hardness** combined with superior toughness. **Deeper hardness penetration** achieved by careful combination of chemical composition and heat treatment. **Uniform roundness** from ball to ball, load to load, for less wear and superior performance. If you have a delivery, performance, or selection problem, call our nearest Sales Office or United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.



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USS

HOW THE WEST SOLVES CRUSHED ROCK SHORTAGE

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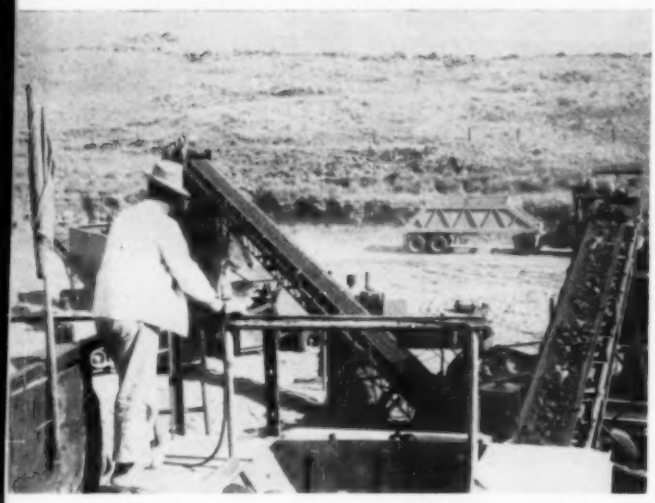


A WELL-BALANCED CRUSHING UNIT operates with all belts full, giving the maximum production of rock per crushing time. Here, both the belt from the primary feeder and the belt going to the bunker are operating at full capacity, giving a production of 2,500 tons per 9-hr. shift

In solid rock, a variety of conditions are encountered. Often the top portion weathers so extremely from the heavy winter conditions that it is impossible to determine the character by the rock underneath. In other instances, a hard layer of rock may cover a rock igneous to such a point of low hardness as to be unsuitable for crushed rock surfacing material.

Lava flows are tricky, for the top surface ledges that give an appearance of unlimited depth and quantity of rock may be just a shelf flow over a clay base and not deep enough to warrant selection for the quantity needed. Under certain conditions, some lava ledges become columnar or lie in hexagonal boulder shape. These, when blasted, break with the seams in large fragments that are impossible to crush.

Since considerable time and money is spent setting up a crushing unit of modern size, it behooves both the contractor and the contracting agency to thoroughly investigate a setup site. Therefore, we usually hand-drill with small compressor and jackhammer in spot locations throughout the selected site. One or two small shots are put off to determine the depth and character of the rock. And we have found that you cannot tell quality entirely by look and feel alone. The produced aggregates must perform their proper function or the money is wasted. Laboratory testing will tell us if the rock has an affinity for oil, needs an additive to prevent stripping or is too abrasive.

All materials are state laboratory tested, and crushing contractors must meet standard specifications as determined by the Washington State Department of Highways. Maximum and minimum percents by weight of material passing each screen and to be retained on the next screen is the common grading specification.

Samples are taken after the first cleanup run of a couple of hours, giving the contractor time to adjust by the look of the rock. And actually, we have found that most competent operators will hit it pretty close right away, needing only minor roll adjustment. Samples are immediately field tested, with final samples being sent to the state laboratory. There is, of course, the possibility that some engineers and contractors, if left to their own devices, would and could prepare a high-grade sample that would meet specifications. Responsible organizations such as Sullivan's, even without inspection, would do their own testing. They are more interested in value production on the roadway, not in having the slightest doubt about the quality of their work.

Specifications become more restrictive as the aggregate moves from base course up to bituminous surfacing production. Every attempt is made to get the material on the roadway in the same specifications as produced. Generally, the base course and top course are hauled directly from the bunker. However, coverstone must be stockpiled for the bituminous subcontractor. Here, we prohibit the conical type of stockpile.

Stockpiles are rectangular, placed in layers of not more than 4 ft. at a time. In hauling, we require the use of bottom-dump trucks which spread uniformly over the surface of the roadway. There is seldom a delay in crushing operations due to shortage of hauling units, for most contractors will balance the longer haul with one or two trucks hitting the short leg. Even with a small storage bin, I have seldom seen a western crushing unit shut down because of haul delay.

Sullivan found that the two-axle truck tractor with an 18 and a 12-cu. yd. bottom-dump trailer was the most economical hauling unit. This combination costs the company about $22,000 to purchase, weighs about 26,000 lb. and will haul a legal payload of about 50,000 lb. Although these fully operated units cost about twice that of a two-axle

Please turn to page 100

YOU GET MORE...

LONGER SERVICE Harder, more ductile wire—extreme care in weaving, tight, rigid, accurate—precision finishing, leveling, hook strip application—gives you much more in durability.

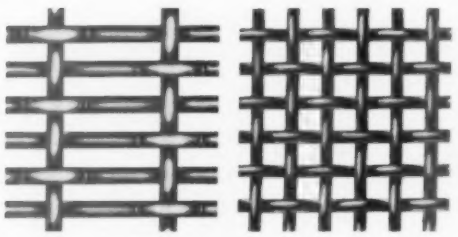
INCREASED PRODUCTION Exceptional accuracy allows tighter tensioning on machines, promises exceptional resistance to abrasion, breakage, distortion, sagging—cuts down-time—increases feed across the screen—reduces plant-clogging re-circulating loads—simplifies meeting tough product specifications—produces uniformly higher quality products.

GREATER ECONOMY In addition to the savings in downtime and service labor, replacement screen cost can be trimmed as much as half. Surprisingly, L-S Screens are priced competitively. Be sure to order them by name.

LUDLOW-SAYLOR

WOVEN WIRE SCREENS

IMMEDIATE SHIPMENT—*most weaves and sizes* • **ASK FOR NEW CATALOG 104**



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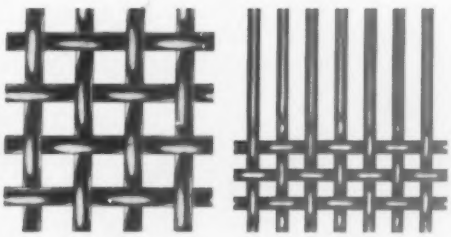

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More proof that...

AMSCO HELPS YOU MOVE MORE TONS PER DOLLAR

How a large contractor and a crusher manufacturer have cut downtime and increased service life with AMSCO equipment

DAILY "TOOTH REPAIR" ELIMINATED BY SWITCHING TO AMSCO 2-PART TEETH

AT MT. VERNON CONTRACTING CORP.

Mount Vernon Contracting Corp. is a large general contractor doing work throughout the middle Atlantic states. Its present contract is for road construction on the Cross Westchester Expressway, linking the New York State and New England Thruways.

The firm's four power shovels and two backhoes on this job are equipped with Amsco dippers or dipper parts and Amsco Simplex* 2-Part Teeth. Reason: competitive teeth previously used required daily welding build-up to maintain their points. Now, since switching to the Amsco Simplex, teeth are changed only about once a week. And change-over is *only a 5-minute job!*

With shovels operating 8 hours a day, 5 days a week, this is a mighty important advantage for Mt. Vernon. No wonder they say—"These Simplex teeth really stand up in service, especially in rock, and save us a lot of downtime."

*Patent No. 2,904,908

AMSCO CRUSHER ROLLS HANDLE 50,000 YDS. BETWEEN BUILD-UPS

AT HIGHWAY MACHINERY COMPANY

Carroll Hicken (left) owner of Highway Machinery Company, Waukesha, Wisconsin, is a long-time user of Amsco equipment. His firm designs and manufactures self-propelled machines for crushing road material, both gravel and stone. All of their machines are rented out or sold to contractors, with maintenance and service handled by Highway Machinery.

For years, the company has used Amsco Manganese Steel Crusher Rolls exclusively. Amsco Manganese welding rods and bars are also used for build-up. On a typical rental machine, pictured at right, the Amsco rolls had *crushed over 50,000 yds. since their last build-up* six months before.

Mr. Hicken says that with Amsco Manganese rods he can multiply the life of a roll by 5 to 10 times. He adds—"They have proven very fine, and we're getting more yardage than with any rods we formerly used."

AMSCO

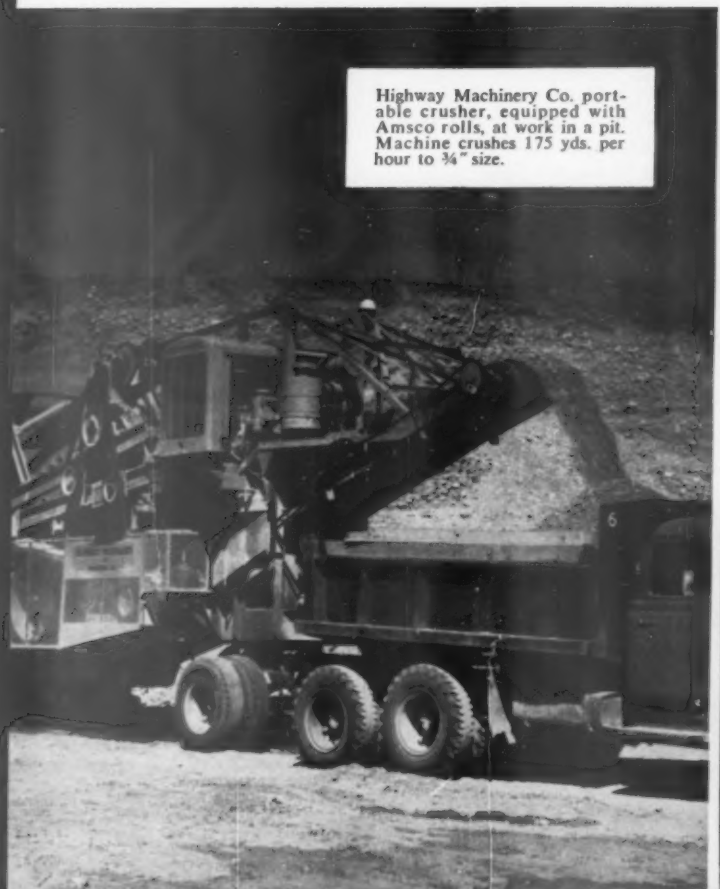
AMERICAN Brake Shoe COMPANY

American Manganese Steel Division • Chicago Heights, Ill.

Other plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis
In Canada: Joliette Steel and Manitoba Steel Foundry Divisions
Welding products distributed by Canadian Liquid Air Co., Ltd.

Northwest shovel, equipped with Amsco Dipper and Simplex 2-Part Teeth, at work on Cross Westchester Expressway project.

Shovel operator, Walter Reich, inspecting Amsco Simplex 2-Part Teeth used on Mt. Vernon Contracting Corp. shovel.



Highway Machinery Co. portable crusher, equipped with Amsco rolls, at work in a pit. Machine crushes 175 yds. per hour to ¾" size.

Amsco 25 x 24 manganese steel crusher rolls, of type used in portable crusher at left.

Welder demonstrating how Amsco Manganese rods are used for build-up on rolls.

continued from page 96

dump truck per hour, they have several advantages. The ratio of labor cost to payload is good; cross-dump models spread thinly and smoothly, reducing blade work necessary; and the units even turn well on the 26-ft. subgrade. To my surprise, on one mountain project having an average 10-percent grade, getting 54 cu. yd. of base course per station, giving 6-in. of material, the empty rigs had no trouble in coming back.

Sullivan's efficiency begins with his move from setup to setup, using mostly his own equipment, and moving in a regularly established order so that each piece falls into place. He has two loads moved by commercial haulers since these are larger than his two-axle tractors can legally handle. He does not have enough moves to warrant investing in this larger moving equipment.

At each setup, Sullivan tries to arrange for plenty of space, with good elevation from the pit to the primary crusher. To facilitate speed of hauling, plenty of approach room to and from the loading bunker is important.

There is no delay time due to quarry operations, since all shooting is done well in advance. However, since only one prime mover is used in the quarry, equipment failure means the crushing operation is halted. Sullivan uses a tractor equipped with a U-dozer and a power unit to feed the crusher. This unit is kept in top repair, and preventive maintenance inspection is carried out regularly.

Keeping equipment in good repair is a critical problem in crushing contracting. Experienced personnel are an absolute requirement, so Sullivan keeps his key men on the payroll the year around. Dependable mechanics are so scarce that Sullivan keeps two on the job to service, inspect and repair the equipment.

Mechanics work nights to make repairs for the next day's run. Just hard surfacing crusher rolls on the job extends their life to better than new. Wear on rolls is concave, and rolls are restored to size when down about ¼ in. Usually the concave worn section is rebuilt with a low-alloy, hard-surfacing flux until contour is re-established. Rolls are cleaned of dirt, grease and rust by power brushing, and frequently inspected for defects and excessive wear. Record crushing requires this coordinated maintenance.

The crushing contractor on western light bituminous projects does the job from crushing to preparing the ballasted roadway for asphalt.

Here is a typical equipment list for a crushing and screening system in our part of the country:

1 motor patrol grader

1 tractor-drawn pneumatic-tired roller

5 truck tractors with 18 and 12-cu. yd. trailers

1 tractor, with U-dozer and power unit for feeding the crusher

1 jaw crusher unit, consisting of 3 x 12-ft. feeder, 20 x 36-in. U-jaw crusher powered by a diesel engine. This unit is usually mounted on a two-axle semi-trailer.

1 4-ft. cone crusher unit, consisting of 4-ft. cone powered by a diesel engine, with 3 x 10-ft. vibrator screen. These units are all mounted on two-axle semi-trailer with underconveyor.

1 3-ft. cone crusher powered by a diesel engine

1 40 x 24-in. U-roll crusher, powered by a diesel engine

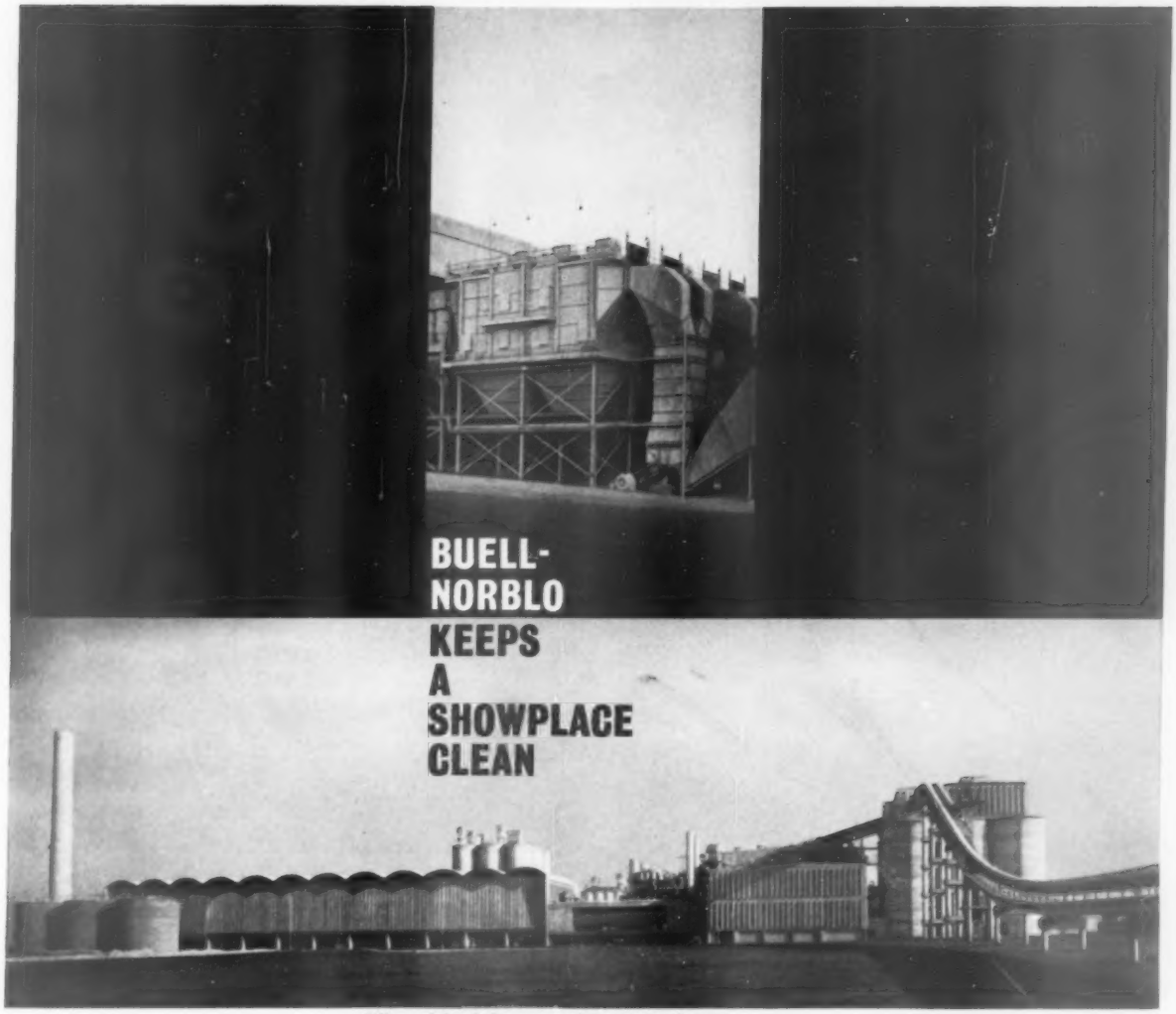
1 diesel-electric generating plant, 100 kw., mounted on trailer with switch and control panel, to furnish electricity for operating electric motors driving all screens and conveyors

1 20-cu. yd. rock bunker, trailer mounted, with 5 x 12-ft. vibrating screen with delivery conveyor

1 20-cu. yd. rock bunker, trailer mounted for loading equipment; this bunker used in tandem with first bunker for loading and storage capacity.

3 65-ft. portable conveyors, for feed, main and return conveyor units. END

THIS IS WHAT COUNTS. Rock from the bunker conveyor pours into the double train. This unit will haul a payload of 32 cu. yd. of 1½-in. to O base course. Five such units satisfy even the most difficult hauling situations



BUELL-NORBLO KEEPS A SHOWPLACE CLEAN

When Ideal Cement Company invested $20,000,000 in plant expansion at Ada, Oklahoma, no effort was spared to create a showpiece of structural beauty and modern operating technology housed in gleaming white cement. Cleaning the air in and around this vast production complex is the job accomplished by Buell-Norblo equipment. You'll find Norblo Dust Arrestors at work in the finish mill and packhouse, a Buell Collector and Electrostatic Precipitator cleaning the kiln gases and Buell Cyclones handling clinker cooler vent air. Here, as in other plants where the accent is on the modern and the efficient, you'll find Buell-Norblo doing the job best. The Buell Engineering Company, Inc., Dept. 17-K, 123 William Street, New York 38, New York, Northern Blower Division, 6408 Barberton Avenue, Cleveland, Ohio. (Subsidiary: Ambuco Limited, London, England). Dust Collection Systems · Cyclones · Electric Precipitators · Bag Collectors · Combination Systems · Classifiers · Discharge Valves

buell Norblo

Enter 1017 on Reader Card

Hoped for: increased loading efficiency
Received: that PLUS 4 *other production jobs*

Result: Michigan replaces 6 machines

By purchasing a big Michigan Tractor Shovel, A. Cope & Sons Ltd, Hamilton, Ontario, naturally could expect *some* production increase over smaller units previously used in their quarry stockpile loading operation.

What they didn't expect was the dramatic increase they got—over 3 to 1. Nor did they expect the variety of other production jobs the Michigan could do *in addition* to its regular loading chores. And, these were jobs that *had been* considered strictly in the realm of crawler dozers and swing shovels.

Daily output: 4,500 tons

In the loading operation alone, the big Model 275A did so well it replaced all three loaders formerly used—a 2½ yd crawler, a 1½ yd swing shovel, and a 2¼ yd

Tractor Shovel. With its 22,000 lb lift capacity and 4½ yd bucket, the power-shift Michigan loads a 12 yd truck in 60 to 70 seconds. In a typical "peak period" 10 hour

day, its output totals up to 4,500 tons of crushed stone. Unit services even the smallest trucks—each one taking only one pass, 20 to 30 seconds, to load.

"One of the Michigan's biggest advantages," says George Eskine, Quarry Supt, "is that it can load from all our stockpiles with a minimum of lost time for travel. Crawler immobility was of course one of the principal reasons we previously had to use three loading units."

In non-peak periods, the mobile 28 mph Michigan

also does many jobs which formerly required at least stand-by assignment of other machines. For example . . .

Builds stockpiles

Stockpiles are located against the face of an old blast area. Trucks, from the crusher, dump at the top. The Michigan Tractor Shovel "dozes" material onto the stockpile, replacing in this job the regular services of a medium-sized crawler-dozer.

Strips overburden

Formerly, a couple times a year, one or two 10-yd scrapers and operators were hired to strip the clayey

topsoil overburden. Now, the Michigan, equipped with bucket teeth, strips and loads this material into company-owned haul units.

Cleans up, loads rock

The Model 275A regularly cleans up after blast and around the 2½ yd swing shovel. This task, too, was formerly handled by a crawler-dozer. Occasionally, also, th- 4½ yd Michigan takes over for the rock shovel. Here, Michigan capacity and maneuverability actually speed the operation. In three quick passes, the Michigan loads an 18-ton rock-hauler.

Mobility and two-way radio key to multi-job production

Right from the start, the Michigan's capacity to do more than just load trucks was evident. Supt Eskine reasoned that with a two-way radio, assignment of tasks would be handled with maximum efficiency. Now, in a matter of seconds, the Michigan can be on its way from stockpile loading to shot rock loading or any one of the five other jobs it normally handles.

The Model 275A, as well as three 17,000 lb lift capacity Model 175A's which the firm operates in other divisions, has helped A. Cope & Sons increase production while cutting overall machinery investment. Perhaps a Michigan Tractor Shovel could do the same for you. Call us for a no-obligation demonstration.

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CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2481 Pipestone Road
Benton Harbor 31, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

NEW ROCK LOADING TEAM

Hauler: 13-ton Michigan Tractor Wagon
Loader: 2¾ yd Michigan Tractor Shovel
Output: 2,400 tons daily on 2-mile cycle

Four years ago, the Fort Scott Hydraulic Cement Company, Fort Scott, Kansas began a program to replace their four crawler-loaders and two 10-ton tandem-axle dump trucks with the most modern equipment available.

The program was completed when a 13-ton rear-dump Michigan Tractor Wagon went on the job a year ago. Its addition gave Fort Scott, one of the nation's three major natural cement producers, an all Michigan fleet. The Wagon teams with a 2¾ yd Model 175A Michigan Tractor Shovel in the rock pit. Three other 2¾ yd Michigan Tractor Shovels handle the crushed rock, coal, and clinkers in this 4,500 barrel-a-day natural cement plant.

Tractor Wagon hauls 120 tons per hour

It's the heavy rock loading and hauling operation that Mr. Pat Thomas, president of the 92-year-old firm, points to as being the best example of how the Michigan machines have improved job efficiency.

Shot Florentine limestone is currently being loaded out of the far end of a pit 90 feet wide and 5,000 to 6,000 feet long. This makes the average haul cycle, between pit and crusher, about two miles.

The 162 hp Tractor Wagon's stability and speed of up to 31 mph is a prime production factor in the mile long *uphill* run from pit to crusher. With torque converter and full power shift, power and speed are instantly adjusted to match the load demand.

On two 10-hour shifts, the Tractor Wagon, sideboarded to meet rated ca-

Michigan 162 hp Tractor Wagon, with torque converter and power shift providing top speed, barrels uphill to plant.

With hydraulic rear dump, Michigan unloads fast. Quick-interchange feature, Wagon for 10½ yd Scraper, provides added versatility.

In spare time, 13 ton Tractor Wagon takes crushed stone from hopper to stockpile.

BOOSTS PRODUCTION 25%

pacity, and the highly-maneuverable 2¼ yd Tractor Shovel will load out an average 2,400 tons of rock . . . rock which weighs, when loose, approximately 2,500 lbs per cu yd.

2 Michigans outwork 3 units formerly used

Production in the rock pit has risen 25% since the Tractor Shovel replaced a crawler rig with similar bucket capacity, and the Tractor Wagon took over the job formerly handled by two 10-ton dump trucks.

When maximum production from the crusher is not a factor, the Tractor Wagon is taken off the shot rock haul and used by itself to build up the crushed rock stockpile, an operation previously handled by two to four random-sized dump trucks.

Compaction has reduced haul road maintenance

An added advantage, according to Mr. Thomas, is the Michigans' compacting action on the haul roads. The 31,500 lb (plus load) Model 110 Tractor Wagon and the 29,000 lb Tractor Shovels have reduced maintenance and actually improved haul road conditions as they travel between pit and plant.

Upkeep "phenomenally small," says president

"With all five of the Michigans working constantly with heavy loads and over sharp rock and abrasive cinders, *we have spent less than $2100 on overhauls, parts, tires and labor during the past three years*," says Mr. Thomas. "I think this figure is extremely low considering what a machine goes through in a cement plant operation of this type. We have had virtually no downtime."

If you're hauling bulky materials off the highway, perhaps a Michigan Tractor Wagon could increase your production, too. When you pair it with one of the eight Michigan Tractor Shovel models (up to 6 cu yds), you've got a team that can't be beat. Let us demonmonstrate. Just call. There's no obligation, of course.

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CLARK EQUIPMENT COMPANY

Construction Machinery Division

CLARK EQUIPMENT

2481 Pipestone Road
Benton Harbor 13, Michigan

In Canada:
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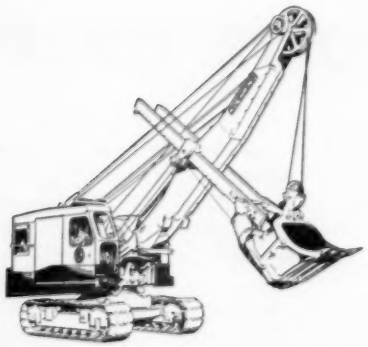

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Part 2

Here's how to pick electrical safeguards for production equipment in the rock products industry

Check your machines for safety

by R. F. Schoof* & T. F. Bellinger†

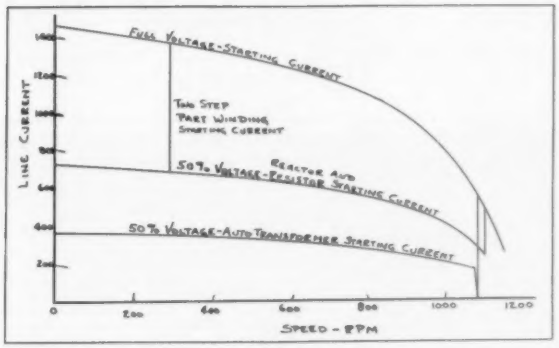

FIG. 1—Reduced-voltage starting current for synchronous and squirrel-cage motors

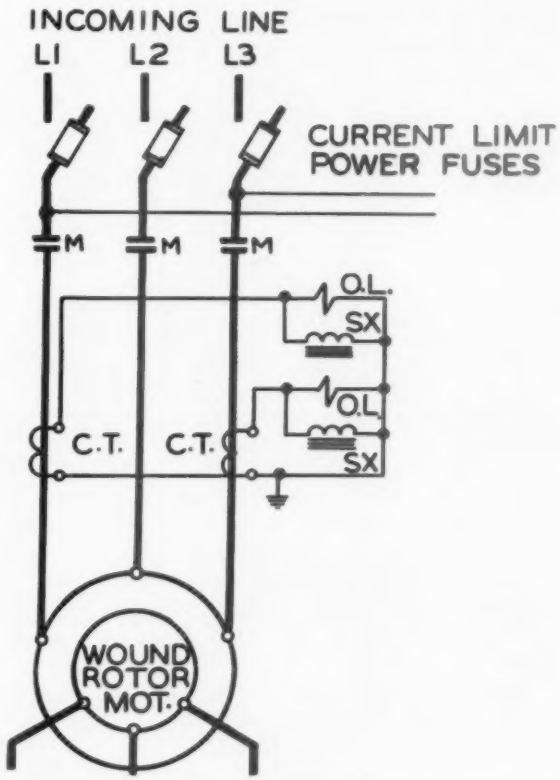

FIG. 2—A saturating shunt may be used to bypass a portion of the high starting current away from overload trips until normal load conditions exist

SAFETY FOR MACHINERY protects your investment. Although personnel safety must always come first, machine safety is important, too. Factors such as machinery life, unscheduled shutdown time and maintenance cost are extremely important from the economic standpoint. Protection requirements vary with different types of equipment, as well as with processing areas in the plant.

Equipment safety problems in a crushing area involve both machinery and motors. Hammermills, jaw, roll or gyratory crushers present different problems and require varied solutions. The first three mentioned are considered high-inertia loads. Usually feeder-loaded, they are subject to high starting friction and unusually long accelerating time required to bring the large masses up to speed. Motors have a tendency to overheat.

Gyratory crushers, on the other hand, have relatively low inertia and often are subjected to highly fluctuating loads which may be as high as 200 or 300 percent of normal. Overheating and stalling are problems here.

Now, for some solutions. Protection against overheating for motors that drive jaw crushers, roll crushers and hammermills must permit the motor to stay on the line long enough to accelerate under normal conditions, but clear it from the power line in case it does not break away or a dangerous overtemperature condition is reached.

Overload protection is essential. But frequently in the field the motor overload protective relays trip before the machine gets up to speed. To accelerate the machine, progressively larger trip

Please turn page

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Editor's Note: See also, Part 1, *How to check electrical hazards*, October 1960 ROCK PRODUCTS, page 126

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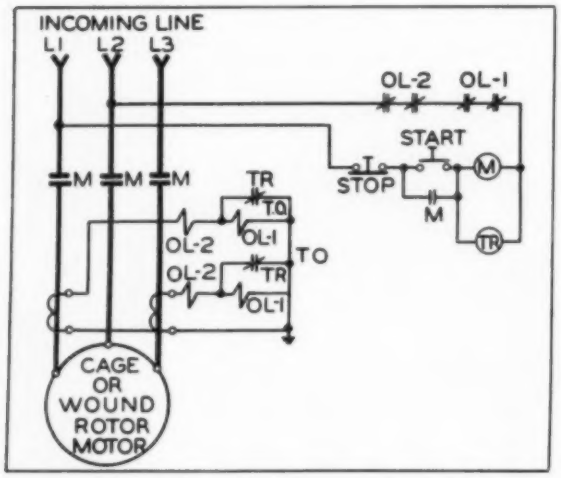

FIG. 3—Schematic circuit for a primary control utilizing two sets of thermal overload relays. Overload relays OL-1 are shorted through a time delay by contacts of timing relay, TR, to prevent tripping on long time starts. Overload relays OL-2 provide protection from excessive starting

elements are installed until the motor finally accelerates its load without tripping. This procedure completely eliminates an important safety feature: overload protection while the equipment is running.

Several methods allow motors driving high-inertia loads to be started without sacrificing normal running overload protection. One common method uses saturating shunts placed in parallel with the overload relay trip elements. Currents of high magnitudes are shunted away from the trip elements in proportion to the degree of overload current.

The shunts, however, have a sharp cut-off point at approximately 200 percent load at which they conduct a negligible amount of current. Fig. 1 indicates a typical starting current curve for a NEMA design "C" squirrel-cage motor being started on full voltage. The saturating shunt, connected as in Fig. 2, would bypass the portion of the high starting current above 200 percent away from the heater until the motor reached approximately full load speed. There the current would drop below 200 percent, and normal load current would be drawn from the line.

A similar method is to apply current transformers in such a manner that they become saturated at higher values of load current, but deliver proportional current to operate overload relays in areas of anticipated motor overload. Special-design relays having unusually long operating characteristics also are available, but here again, some degree of running protection is sacrificed.

Perhaps the best arrangement for protecting motors during acceleration and normal running conditions uses two separate sets of overload relays as shown in Fig. 3. One set trips the motor on the basis of starting currents; the second set protects the motor on the basis of normal running currents. The latter relays are disconnected or shorted out of the circuit during acceleration.

Motors driving primary gyratory crushers must be protected against overheating because of high load fluctuations and the possibility of stalling. These crushers are usually dump-loaded. The crushing eccentric is subjected simultaneously to fines (60 to 90 percent of the normal loading) and to large particles up to 3 to 4 ft. diam. During a crushing cycle, the motor loading may fluctuate to 200 to 300 percent of normal until the crushing has been completed. Then the motor may run unloaded until a new charge is dumped.

Highly fluctuating load cycles often produce false tripping. This condition is, of course, extremely undesirable because tripping a crusher under load usually means that the crusher must be dug out before it can be restarted.

Overload protection for motors driving primary gyratory crushers should be based on actual loading, determined from a crushing cycle. This can be determined by averaging the area beneath the trace of a recording ammeter chart. After the proper size of the protective elements has been established, the motor controller circuit should be arranged so that the overload relays would either sound an alarm without tripping the motor, or would sound an alarm and trip it after a predetermined delay (Fig. 4). Either arrangement would not stop the crusher with material in the chamber immediately, but would give the operators a chance to clear the chamber first. Fig. 5 shows an actual recording load chart taken from a primary gyratory crusher employing choke or dump feed.

Repeated cycling of highly fluctuating load currents makes protection of the drive motors from overheating very difficult. Because overload relays tend to trip prematurely, operators sometime set overload protection beyond a point of safe operation. The problem becomes more complicated because of the thermal-overload relays in the remotely located controller. It operates in a different ambient and has a much greater heating and cooling rate than the motors. *Turn to page 110*

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CHECK YOUR MACHINES FOR SAFETY

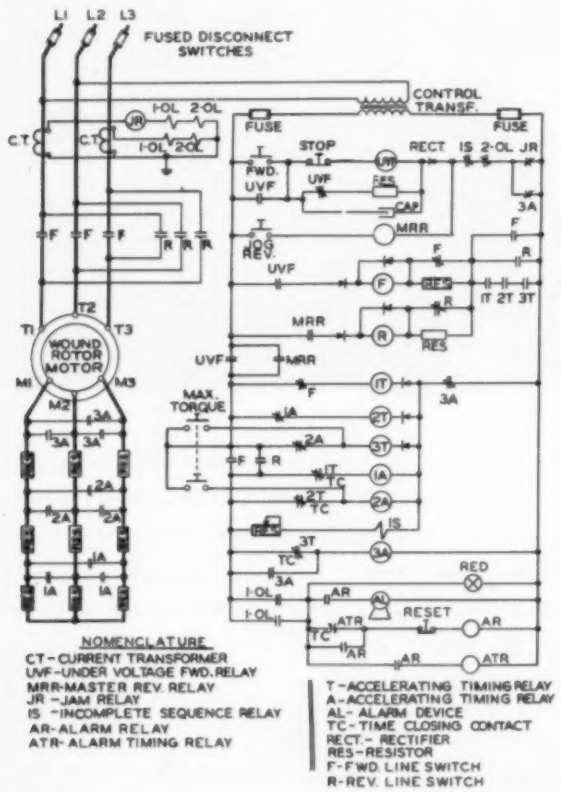
continued from page 108

A different type of overtemperature protection is often used for these motors subjected to highly fluctuating loads. Temperature detectors and thermostatically operated switches can be placed adjacent to the windings of the motors. These devices can be operated independently or in conjunction with overload relays and controllers to sound alarms or to shut down the motors when maximum allowable temperatures are approached.

Stalling of gyratories is produced by packing or by the presence of noncrushable materials in the crushing chamber. When this happens, the driving motor should be disconnected from the line instantly, not only to minimize mechanical damage to the crusher and coupling mechanism, but to provide maximum overtemperature protection to the driving motor.

Thermal overload relays and temperature devices located in the motors have inverse time characteristics; normally, they are not fast enough on a stall condition. To obtain more positive, fast tripping on stall, instantaneous current relays have been used. These relays must be bypassed during motor acceleration and adjusted high enough to be inoperative on maximum load peaks.

FIG. 4—Timing relays may be employed to sound an alarm and produce actual tripping in the motor controller circuit. The relays are shown here as part of the over-all control circuit of a wound rotor motor crusher drive



When stall conditions occur, the motor will draw currents from the line approaching 600 percent or above, far in excess of the 300-percent load peaks which might be expected during operation. The jam protective relays would be set between the 300 and 600-percent limits. Instantaneous stall or jam protection is included in the wound rotor controller circuit shown in Fig. 4.

If noncrushable material in the chamber causes stalling, instantaneous tripping does not substantially protect machinery from failing due to overstressing. Usually the damage is done before the motor stalls. The best protection is to: (1) prevent the materials from getting into the crushers and (2) provide a form of mechanical safety valve which will be actuated before damaging stresses are reached.

Metal detectors, sorters and sizers placed in conveyor feeds are helpful in diverting some noncrushable and oversize materials. These devices, however, will not provide 100-percent protection. On small drives, sometimes slip couplings and shear pins are used. Such safety mechanisms have not met with a great deal of acceptance because of the shutdown which they produce. Therefore, they are usually made inoperative.

The most positive protection for overstressing of gyratory crushers appears to be hydraulic setting and maintaining of the crushing mantle. The hydraulic mechanism adjusts the crushing head clearance and provides automatic tripping to dump the chamber load when abnormal stresses are being produced.

Stalling of gyratory crushers is also brought about by inadequate operating voltage for the driving motors and by complete power outages. Stalling of this nature usually does not damage the crusher; however, it can place the driving motor in jeopardy by creating a condition where the motor can't restart the crusher with the chamber full. Usually operators make several attempts to break loose the loaded crusher rather than dig it out by hand.

The loaded crusher may be accelerated after a stall if it is driven by a wound rotor motor and there is proper selection of starting resistance. Several automatic features are available on such controllers. Some installations have been equipped with reversing controllers to facilitate working

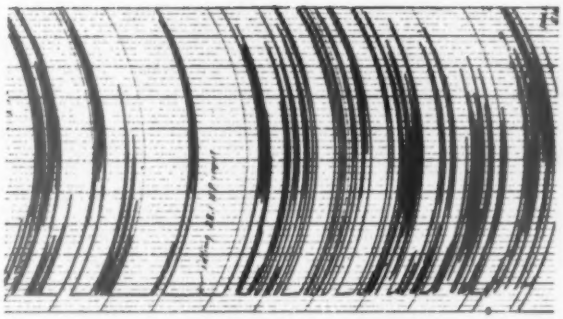


FIG. 5—Kilowatt chart for a gyratory crusher. Full scale is 400 kw.; motor is rated 150 kw. with motor operating near full load

loose the crusher in a jammed condition. However, caution should be exercised when reversing control is used on a gyratory crusher. Such crushers should never be operated at normal operating speeds in the reverse direction of rotation—this could loosen the crown nut and allow the eccentric spindle to topple.

To facilitate breakaway with reversing control, the reversing circuit normally is provided with spring-return, jog-type, push-button operation only. More positive protection can be provided by use of motor shaft speed switches which are operative in the reverse direction only. They stop the motor should it accelerate to the principal speed in the reverse direction.

Wound rotor driving motors provide the most satisfactory operation of larger gyratory crushers. Controllers are available for both manual and automatic operation, the latter providing the better over-all protection. Other types of crushers usually are driven with cage motors but wound rotor motors are used where extremely large starting torques are required or where starting power capacity is limited.

Grinding mills present a different problem. They usually have constant loading, are started infrequently, and normally are driven with synchronous motors. An occasional problem is starting and accelerating this large equipment. At the point of breakaway the starting torque requirements are extremely high until cascading of the mill charge starts. With some mills, the machine must be jogged with the motor to get enough oscillation for the charge to cascade. Jogging also is employed to "spot" manholes and other areas for maintenance and inspection purposes.

This jogging, consisting of repeated starting and stopping, requires the motor controller to close in and interrupt the high starting current. Although controllers are designed to withstand this type of service, it greatly reduces their life and places an unusually large burden on the power system. Therefore, controllers have been made available for use with grinding mills which deliver low-voltage, low-frequency power to the driving motor so it can be rotated very slowly at very high available motor torques.

This type of operation, referred to as inching, provides a way for breaking mill charges loose and offers a method for precise positioning for inspection and maintenance purposes. To reduce costs, a single inching controller can position several different mills within a common area.

Mills and mill motors should never be operated in a reverse direction of rotation. Greatest hazard of such operation concerns the pinion gear: an upward force on it tends to pull up the sole plate, foundation for this gear. Continued operation in the reverse direction also would render the cooling fans on the motor ineffective and decrease the amount of lubricating oil being applied to the mill bearings.

Inching controls afford limited forward and reverse operation. However, reverse should be used only in extreme emergency, since torques developed can equal or exceed normal starting torques and damage the pinion gear. In addition to standard caution nameplates, some inching controllers have spring return, momentary initiating contacts for the reverse inching operation. Inching controllers have intermittent ratings and normally should not be operated for more than 5 to 10 min. in any half-hour period.

Perhaps the greatest hazard of motor jogging is overheating of squirrel-cage starting windings on synchronous motors. These are similar to the conventional rotor windings of squirrel-cage motors, but have very low thermal capacity and are rated for intermittent use only. Many windings of this type have a maximum allowable operating time of 60 sec. near synchronous speed and 5 to 10 sec. at zero speed.

Special overtemperature protection normally is furnished with synchronous motor starters by relays mounted within the controller. Because of the extremely great difference in masses between the protective relay and the rotor of the motor where the starting windings are located, the protective relay cools much more rapidly than the rotor. Adequate protection under repeated starts at close in-

Please turn page

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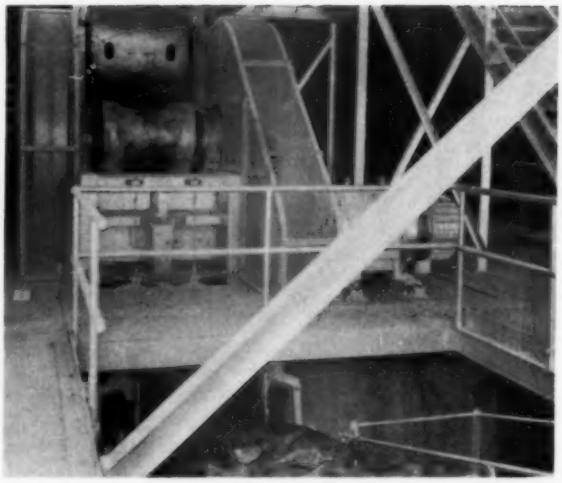
tervals is thus not always possible and, if jogging must be done, automatic provisions should be made in the controller to limit the number and the frequency of starting operations.

If there is any doubt about the temperature of the starting winding, the temperature should be determined before another starting operation. A good practice is to allow three or four normal starts per hour on synchronous motors driving grinding mills with an interval of about 15 to 20 min. between starts. Timing will vary with size and style of motor and starting conditions.

If there is any question about the thermal capacity of a motor, specific operating data and starting limitations should be obtained from the motor manufacturer. However, here is a reasonably good guide: If either the starting damper bar windings on the rotor or the stator winding is too hot to hold the hand on for several seconds, the motor is too hot to be started. It should be allowed to stand 20 to 30 min. before another starting operation is attempted. If the hand can be held on the windings for a few seconds, it is reasonably safe to start the motor.

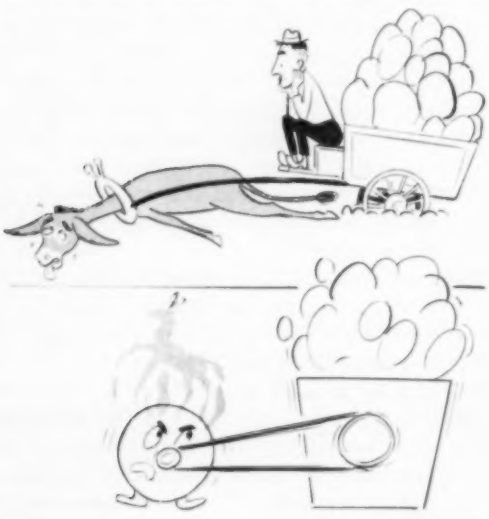
Proper lubrication of grinding mills is essential. Maintaining adequate lubricating pressures during starting actually can determine whether the motor will break away to accelerate the load or will remain stalled.

Large mills fully charged may have masses approaching 100 tons; such weights easily can wipe out babbitt bearings on starting if sufficient pressure is not present to float the static load. To lift the mill off the trunnions and prevent starting on dry bearings, about 1,500 to 2,000 psi. of lubricating pressure is needed.



BESIDES GOOD SAFETY PRACTICES, this plant cares for equipment, too. Wound rotor motor on jaw crusher provides necessary starting torque when machine is stopped under load

A JACKASS KNOWS when his horsepower has been exceeded; but a motor never knows when it's licked, has horsepower to burn



While manually operated pumps frequently are used for this purpose, they often prove inadequate. There is more positive protection in the use of automatic motor-operated pressure lubricating systems. They deliver between 1,500 and 3,000 psi. but drop to a much lower positive value after the mill has reached running speed. Such systems are interlocked with the motor controllers to prevent motor start-up unless the lubricating pressures are adequate. Such systems are provided with alarms and signals to indicate faulty operation. The mill driving motors can be supplied with similar lubrication systems, but normally they obtain adequate bearing protection from overtemperature cutoffs or alarms.

The most recent step in the evolution of trunnion protection is an automatic, continuous lubrication system. Consisting of high and low-pressure pumps driven by a common ½-hp. motor, the system runs 24 hours a day, 7 days a week, even while the mill is not in actual production. Timing interlocks are eliminated and danger of bearing distress removed, even for hot mills shrinking after shutdown.

Editor's Note: Part III will conclude with safety requirements for conveyors, motors, and power systems

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National Lime Association operators analyze firing techniques to step up production in shaft and rotary kilns

Lime operators probe fuel economy

JUBILANT WINNER of the first annual Azbe Award is Thomas G. Miller, center, of the National Gypsum Company. He receives the congratulations of presiding officer M. A. Rickard, left, and donor Victor J. Azbe

ROCK PRODUCTS SAFETY AWARDS were accepted by E. C. Buethin, for U. S. Gypsum's Genoa, Ohio, plant; Kenneth A. Gutschick, for the Eldorado, Calif., plant of Diamond Springs Lime Company; J. N. Eppman, for the Bellefonte, Pa., plant of National Gypsum Company, and John C. Lanham for the Thornton, Ill., quarry of Material Service Company

TWO of the 1,000-day safety certificates were received by Oreste Brazzale of Rockwell Lime Co., Manitowoc, Wis., and John C. Lanham of the Thornton quarry of Material Service

LIME KILN BURNING EFFICIENCY was the dominant theme of the annual meeting of the Operating Division of the National Lime Association. Included were intensive discussions of refractories and fuels for both rotary and shaft kilns in the lime industry.

Highlight of the meeting was the presentation of a $1,000-check to T. C. Miller of National Gypsum Co. He was winner of the first annual Azbe Award, presented by Victor J. Azbe, long-time lime consultant and ROCK PRODUCTS contributing editor. Another feature of the meeting was a trip to the Acme Steel Co., where the Linz-Donawitz steel-making process is installed. The operators also visited the Marblehead Lime Co. plant and the quarry of Material Service Co. at Thornton, Illinois.

Safety awards included a record number of 23 certificates for a year without accidents. Seven awards were made to plants accumulating a record of more than one thousand days without a lost time accident.

ROCK PRODUCTS awards were made to U. S. Gypsum's Genoa, Ohio, plant; Diamond Springs Lime Co. at Eldorado, Calif.; National Gypsum Co. at Bellefonte, Pa., and to Marblehead Lime Co.'s Thornton plant.

"Prescription" refractories are now available to lime producers, and the usefulness of dams and special refractory constructions within kilns is well established. Thus, the producer is in a position to obtain a uniform useful life for the refractories in all parts of his kilns. Once this has been achieved, the next step is to upgrade the refractories to achieve greater lime production over a

Please turn to page 116

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LIME OPERATORS PROBE FUEL ECONOMY

continued from page 114

longer time without refractory maintenance. This is the substance of O. M. Wicken's remarks to the meeting. He described the application of several developments that his company, Harbison Walker Refractories Co., has made in refractory technology. These developments include quadrant and trefoil heat exchangers and insulation techniques to permit up to 2,600 deg. F. within the kiln.

Also on refractories, R. A. Witschey of A. P. Green Fire Brick Co. summarized the development and the technology of monolithic refractories. These castable or plastic refractories have superior properties to masonry or suspended refractories for many applications in the lime industry.

A panel set the stage for the discussion of coal firing in rotary kilns. The participants included Moderator A. M. Caito, Lee Niems, Clarence LaLiberte and Virgil Tadsen. Consensus of the discussion was the superiority of coal over other forms of fuel for the rotary kiln. One of the admitted disadvantages of coal is the formation of ash rings just beyond the end of the combustion zone in the kiln. Mr. LaLiberte outlined his company's ingenious technique for getting rid of the rings. This is an "air-quench," admitting cold air to the chamber for 5 to 15 min. every 8-hr. turn. The kiln loses about 3 hr. production every 96 hr. compared with only 1½ hr. for shooting the rings. But the savings in kiln gun shells is enormous, dropping from 31,000 shells annually in 1956 to 3,000 rounds in 1959.

H. E. Ellis of F. L. Smidth & Co. developed the theme of rotary kiln efficiency even further. The kiln owner has two ways of improving efficiency: One, to have various improvements like crosses and external coolers or recuperators or to add a traveling grate preheater. This grate system proved to be so efficient in a Danish lime plant that its production was stepped up radically while Btu. requirements were dropped from 8.6 million to 5.7 million Btu. per ton of lime.

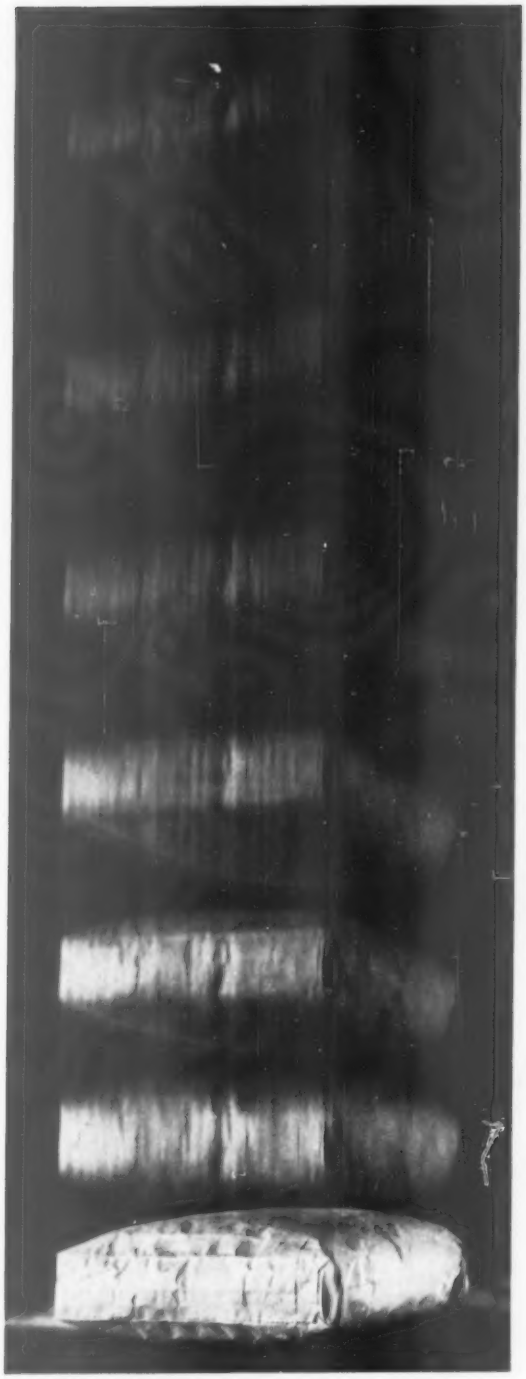
Shaft kiln efficiency was considered by Victor J. Azbe who outlined the problems and the solutions for converting a number of kilns to oil firing. This conversion is particularly important to several European countries where imported oil is much more economical than any other form of fuel. Secret of Mr. Azbe's success with the conversion is the ingenious design of the chambers spaced radially around the kiln that burn preheated oil. The gasified mixture of hydrocarbons burns deep within the charge of stone to produce lime with exceptional thermal efficiency.

A visitor from England, Dr. G. E. Bessey of The Chalk, Lime & Allied Industries Research Association, contributed to the dissertation on burning. He described the Brockham kiln that is useful only for burning chalk. This high-moisture form of limestone is peculiar to the British Isles and requires special treatment to produce lime. A mixture of lime and coke is introduced into a narrow flue about 5 ft. diam. where moisture is evaporated as the coke burns. Then the preheated, dried stone works its way downward into a belled firing chamber where coal is added to complete calcination reaction. Air-operated gates draw finished lime.

Control of air pollution is becoming more important in the lime industry—as it is for all segments of the rock products industry. A most comprehensive and timely paper on dust collection devices was presented by David Wheeler of Kaiser Engineers. The advantages and disadvantages of the six major types of dust collectors were explained, including the several types of mechanical collectors, the electrostatic and the newly developed sonic collectors.

Taking a page from the cement industry's book, the lime operators heard Ivan F. LeGore, director of safety of the Portland Cement Association. "Safety Makes Good Sense" was the title of the compelling talk and it went a long way to explain the spectacular safety record of the portland cement industry (See ROCK PRODUCTS, February 1960, pp. 110-120). For one thing, every member of the PCA participates in that association's safety program. For another, every accident is carefully analyzed and the conclusions widely and thoroughly distributed to nearly 10,000 foremen, supervisors and managers in portland cement plants. Nor is the effort confined to compiling statistics. There is a positive program for developing a mature outlook on the importance of safety at all times and in all places.

The National Lime Association's safety record for 1959 and the preliminary results for 1960 were revealed by Kenneth A. Gutshick, Manager of Technical Services. Accident frequency rate for the lime industry was 14 per million man-hours, up one point from 1958. While the lime industry was substantially better than many other rock products producers, the severity rate soared because of three fatalities. Nor will the severity rate be down during 1960 with the three fatalities that had already taken place by the first of October. Some small satisfaction can be gained by the slight drop in frequency to 12.7 for the first seven months of the year. **END**



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how COLUMBIA ingenuity and armor-tough manganese steel crusher parts increased production 30%, jaw life 75%, on rugged Utah job...

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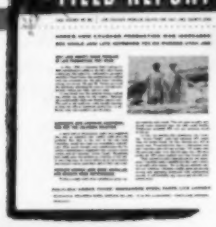
FIELD REPORT



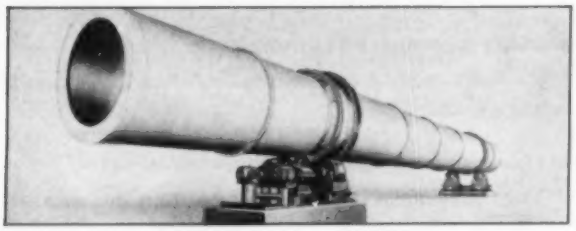
Columbia's complete line of ARMOR-TOUGH crusher parts provides more wear where it counts, where rock meets metal. For greater production, longer life, specify COLUMBIA.

Columbia

COLUMBIA STEEL CASTING CO., INC.
933 N.W. Johnson, Portland 9, Oregon

Enter 1039 on Reader Card

THE KILN OF TOMORROW . . . TODAY
DESIGNED AND BUILT BY: VULCAN
THE OLDEST NAME IN ROTARY KILNS



SIMPLE . . . ECONOMICAL . . . RUGGED . . .

HERE ARE THE NEW PATENTED FEATURES:

NEW self aligning trunnion rollers

NEW constant thrust load control

NEW integration of girth gear and riding ring

NEW application of anti-friction roller bearings

Vulcan's new kiln in your operation will simplify your foundation plans, lower cost of erection, decrease maintenance costs, and cut down-time . . . Write today for more information.

111 YEARS OF KILN EXPERIENCE

VULCAN IRON WORKS, INC.

WILKES-BARRE, PA.—CABLE ADDRESS: VULWORKS

COOLERS—DRYERS—RETORTS—CALCINERS—SUGAR MILLS—SHEAVES
VERTICAL LIME KILNS—STEEL CASTINGS—GEARS TO 24' DIA.

Enter 1040 on Reader Card

ROCKY'S NOTES

continued from page 22

form the basis of portland cement clinker. According to all the textbooks, clinker research has been limited because of the difficulty of handling a mixture of more than three or four mineral components. In this research on the mode of formation of natural silicates by combining a three-component mix with another two-or-three-component mix, it has been possible to study eutectics of more than four-component systems. Thus, it should be possible to learn more about the effects of the alkalies, iron and magnesium oxides in portland cement by similar methods.

The paper on "The Geochemistry of Thorium and Uranium" could well prove of some value to producers who are crushing rock for one purpose or another. These elements are much in demand, and are liberally distributed in the earth's rocks, but in very small percentages or parts per million (p.p.m.). However, these elements are usually concentrated in certain minerals of which bedrocks are composed. Thus in crushing rock and collecting the dust, it may be that the particular mineral or minerals richest in uranium and thorium may be concentrated. It certainly looks worth investigating. Many shales are also relatively high in these elements. **END**

"THE AGGREGATE HE BOUGHT FOR HIS CONCRETE MIX PROJECT WASN'T WASHED WELL ENOUGH TO SUIT HIM!"

Only Spencer uses military type underwater tests to determine the relative effectiveness of commercial explosives. These tests are the latest in a continuing research program conducted by Spencer Chemical Company, the pioneer supplier of solid ammonium nitrate as an ingredient in blasting.

Precise new underwater testing method shows . . .

Spencer N-IV And Fuel Oil Produces Up To 7 Times As Much Useful Energy Per Dollar

. . . when compared with gelatin dynamites

How do you measure the true blasting effectiveness of commercial explosives? Unsatisfied with present methods, Spencer Chemical Company and a well known research organization teamed up to discover a better way.

After extensive investigation Spencer adopted underwater testing methods developed through military research. These were found to provide data better related to commercial blasting than any other testing method. As a result, more accurate standards of evaluating the actual useful output of explosives have been developed.

Latest test results show that Spencer N-IV Ammonium Nitrate and fuel oil deliver up to seven times as much useful energy per dollar as gelatin dynamites (see chart at right).

Extensive research has also shown that Spencer N-IV, when mixed with the recommended 6% fuel oil, delivers 20% to 25% more blast energy than equal charges of other solid ammonium nitrate-fuel oil mixtures. There are two main reasons for this: (1) lower density which provides greater ease of detonation, (2) special prill structure which allows fuel oil to be absorbed more evenly.

It costs you nothing to get the full benefits of Spencer's advanced knowledge and experience in this field. Just mail this coupon. No obligation of course.

PERFORMANCE COMPARISON OF BLASTING MATERIALS

Explosive	Heaving Energy Ft. Tons/Lb.	Shattering Energy Ft. Tons/Lb.	Effective Energy Ft. Tons/Lb.	Useful Energy Ft. Tons/$
Spencer N-IV and Fuel Oil	423	60	483	14,230
40% Gelatin Dynamite	257	115	432	1,770
60% Gelatin Dynamite	384	84	372	1,800

SPENCER®

Spencer Chemical Company
Industrial Ammonium Nitrate Sales
405 Dwight Building • Kansas City 5, Missouri

Without cost or obligation, please send me the latest information on the use of Spencer N-IV and fuel oil for blasting.

Name_____

Firm_____

Address_____

City_____ State_____

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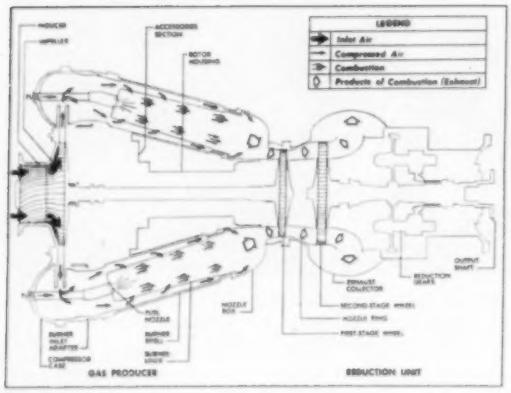
TRUCK TALK

by CHET CUNNINGHAM



A new gas turbine engine practically made to order for producers of crushed stone, sand and gravel, cement and aggregates that can be used in trucks has been set for completion for November of this year.

This new turbine engine turns out 420 hp. and will add one more entry in the big re-power and engine conversion field. The engine is in its final engineering evaluation now. They were originally announced as available in March, but engineering changes and field testing delayed them.

This whole series of off-the-road gas turbine engines has been in development for 17 years. There is a line of the turbines from 240 through 550 hp., and all designed specifically for off-the-road trucks such as those used in this rock products industry. The first one ready is the 420 horsepower rig.

The turbine works as any other gas turbine. As seen in the picture here, air is sucked in at left and compressed. It passes to a combustion chamber where it joins the fuel supplied under pressure by a fuel pump and governor unit. Combustion of the fuel-air mixture is continuous after it begins.

The hot gases from combustion expand to the right end of the chamber where they spin the first stage turbine wheel. This runs the intake air compressor. The hot gas then moves on to the second stage turbine wheel which powers through reduction gearing to its right, the engine's output shaft.

This turbine uses a 24-v., 30-amp. starter generator unit with a negative ground circuit. Ignition is used only during starting. The continuing ignition of the air-fuel is through a capacitance-discharge ignition unit and two vaporizing-type spark plugs.

The engine is adjusted to operate on diesel fuel (Military F-896) or its commercial equivalent. Adjustments can be made without any changes to the system so it can operate on jet engine fuel or kerosene.

Because the gas-driven turbine principle is used, the engine automatically becomes a torque-converter-type of retarder for down-hill braking. This, of course, helps save on your service brakes.

Further detailed specifications can be obtained from Boeing Industrial Products Div., P. O. Box 3707, Seattle 24, Wash.

Safety in the rock products industry is not a campaign or a promotion. Safety is a state of mind. Men can be trained to think safely by constantly being reminded of safe work habits and safe driving habits.

Do you service your own truck tires? If you do, you may be in for some surprises about how an outside tire service works—and what it can do for you. Some heavy construction outfits and mining and rock producers farm out all of their tire maintenance. They say it saves them money.

A typical tire service outfit works at night or when the units are idle. This work includes a program for checking and maintaining tire pressure. Correct pressures are vital to long life and cost reduction. The condition of each tire is also analyzed at each pressure check.

These service groups have a special truck for handling large tires. It comes equipped with hydraulic tire removers, 20-ton jacks, a hydraulic crane, pneumatic wrenches, air compressor, air hammer, small tools and replacement valves.

The tire specialists then talk with the owners of the company about truck speed, tire loads and other operating conditions, to work out limits that specific tires can stand under job conditions.

One of the items these men talk about is the condition of the haul roads. They encourage a definite program to keep haul roads smooth and clean. The cost of keeping rocks off your haul road will save thousands of dollars in ruined tires.

Enter 1041 on Reader Card

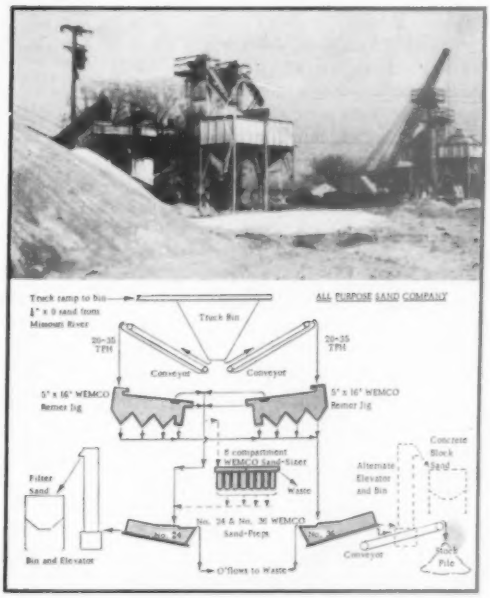
SOLUTION OF "UNSOLVABLE" PROBLEM:

Wemco-Remer Jigs profitably separate fine coal from sand!

In the St. Louis area, lignite, or fine coal, in sand deposits has long been an "unsolvable" problem—an obstacle to profitable production of specification sands.

But All-Purpose Sand Company, of St. Louis, found the answer. "The Wemco-Remer Jigs *did* it!", in the words of Mr. Kenneth Wikowsky, partner and vice-president. In a plant designed by Marsh Engineering Company, and incorporating two Wemco Sand-Preps, the company now removes all lignite coarser then 1/16" and a majority of finer fractions, thus meeting specifications for concrete sand, filter sand and blasting or traction sands in the area.

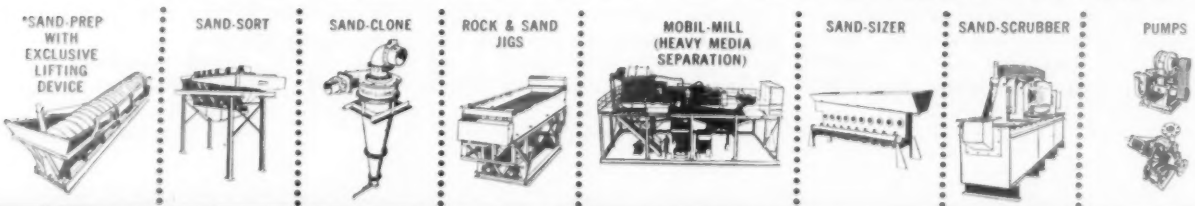
All-Purpose is another example of how Wemco equipment and modern beneficiation techniques enable the industry to produce higher quality products—for greater profits.



WEMCO® *a division of*
Western Machinery Company
650 Fifth Street • San Francisco, Calif.

In Canada: Western Machinery Company (Canada) Ltd. • 129 Adelaide Street, West . . . Toronto, Ontario

THE WEMCO LINE OF QUALITY MACHINES FOR PROFITABLE AGGREGATE PROCESSING



NEW LITERATURE

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

Kit for servicing brake spiders

SUPERIOR MACHINE CO. has announced a maintenance kit that makes it possible to salvage worn brake spiders without removing them from the axles. The kit, consisting of a positioning fixture, two drill reamers, one finishing reamer, anchor pin locators and other items, provides all the equipment necessary to bore and bush anchor pin holes on all drive and trailer axles equipped with 16½ and 18-in. diam. air brakes. No service parts are needed. The kit may be ordered for either 2½ or 3-in. anchor pin hole spacing or a combination of both. Each kit comes complete with 25 steel anchor pin hole bushings.

Enter 500 on Reader Card

Safe winter driving

NATIONAL SAFETY COUNCIL has published a booklet in which actual driving tests during the harshest mid-winter conditions provided the data to help drivers of trucks overcome the hazards of winter driving. "Keep Rolling with Safety in Winter Weather," outlines the six major hazards of winter driving, including increased braking distances and the effect of temperature on starting and stopping. Test facts on jackknifing and its prevention, as well as maintaining control in skids, are explained in detail. Use of tire chains is discussed—and strongly urged. An 11-point checklist of essentials for preparing vehicles for the perilous winter driving season is included.

Enter 501 on Reader Card

Mining tools

KENNAMETAL INC., Mining Tool Div., presents its line of mining tools in a revised catalog. This 24-page booklet includes several styles of cutter bits that are not in the company's previous M-9 catalog. Additions include shank styles, an extra strong style for boring-type continuous miners, a series with side shoulders, and the heavy-duty bits with new gauge shoulder location.

Revisions and rearrangements of specifications also have been made on rotary drill bits, roof bits and augers, auger adapters, core bits and finger bits. A section dealing with wear proofing illustrates cemented carbide inserts and blanks, and methods of applying tungsten carbide hard facing.

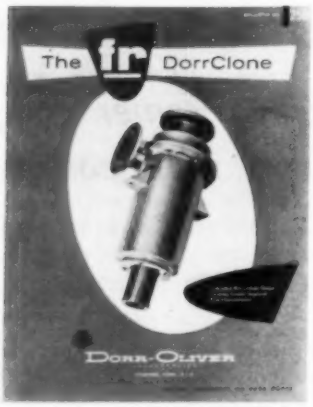
Enter 502 on Reader Card

Conversion kits

FEDERAL-MONGUL SERVICE, Div. Federal-Mongul-Bower Bearings, Inc., has issued a bulletin that illustrates and describes the company's line of conversion kits for the oil lubrication of truck and trailer axles. It is said that with the use of these kits, no special tools are needed for quick installation or for checking oil level. Included is a "see-thru" plastic hub cap that lets you check the oil level at a glance. The conversion kits come equipped with: transparent hub cap with bolt-on-cap retainer ring and cap plug; hub cap gasket; O. D. adapter, molder synthetic ring; ceramic faced, unitized cartridge-type seal, I.D. adapter ring.

Enter 503 on Reader Card

Liquid cyclone bulletin



DORR-OLIVER INC. has revised and reissued an eight-page brochure describing rubber-lined liquid cyclone classifiers. The unit described in this brochure is manufactured in several easily replaceable parts. It is available in 6, 12 and 24 in. diam., each furnished with a choice of several sizes for vortex finder and apex valve openings. In addition, the apex valve opening can be further adjusted without disassembly.

A description of underflow control has been added in the revised brochure. Supplied as an accessory, it maintains a reasonably constant underflow density automatically and without instrumentation.

Enter 504 on Reader Card

(Continued on page 124)

PLAY IT SAFE

Do you want low cost or low price? There's a whale of a difference. Bucyrus-Erie excavators — as has been widely demonstrated — don't eat owners out of house and home with maintenance and upkeep costs. Moreover, on the records of hundreds of owners, they stand head and shoulders above others on low cost per yard produced.

And when modern improvements are added, as they are constantly, they won't be "made available," they'll be **standard** . . . because you expect it with a Bucyrus-Erie.

5-YARD SERIES TWO 88-B . . . a good example . . . can be diesel or single-motor electric-powered. Diesel model has twin-governor dual control as standard equipment . . . different crawler mountings to fit your job . . . a strong shovel or dragline front end that swings more payload, less dead load.

Invest in a Bucyrus-Erie and find out what low-cost production really means to profits. Bucyrus-Erie Company, South Milwaukee, Wisconsin. 41E60

Owner, Southern California Edison Co., Edison Building, Los Angeles, California.

. . . most respected name in the field

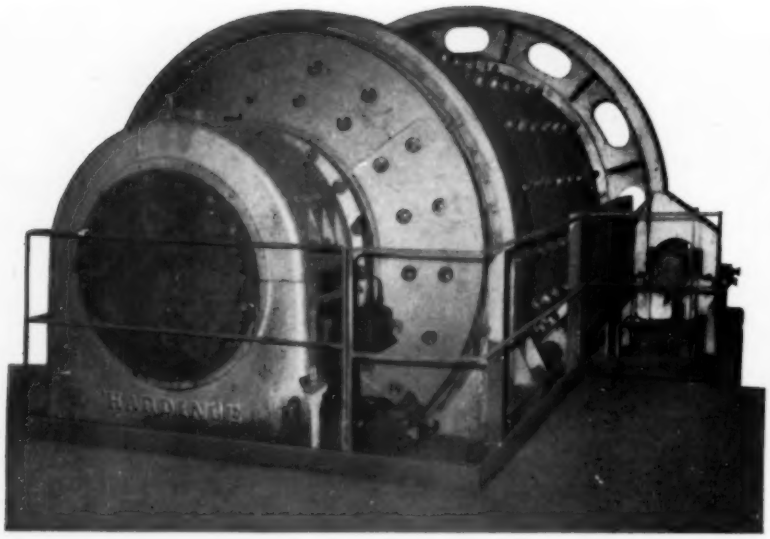
BUCYRUS-ERIE

looking toward

IMPROVED PRODUCTION ... look to Hardinge !

Hundreds of Hardinge Rod Mills are in use on such widely divergent applications as the reduction of aggregate, coke, abrasives, metallic and non-metallic ores, and the preparation of concrete sands. Mill sizes range from 2 feet to 12 feet shell diameter and up to 1500 Horsepower. They are available for either wet or dry grinding, arranged for trunnion overflow, or peripheral discharge (end or center). The conical heads of Hardinge Rod Mills provide a feed pocket to allow the charge to enter the rods without over loading or "choking." Ask for catalog No. 25-C-7.

HARDINGE ROD MILLS



An 8½' diameter by 12' long Hardinge Conical-Head Rod Mill grinding coke. Note the end peripheral discharge hood, starting lubricator and water-cooled bearings.

HARDINGE
COMPANY, INCORPORATED
Main Office and Works • 240 Arch St., York, Pa.
"Hardinge Equipment—Built Better to Last Longer."

NEW YORK
TORONTO
CHICAGO
HIBBING
SALT LAKE CITY
SAN FRANCISCO
HOUSTON
LAKELAND
BIRMINGHAM

Enter 1057 on Reader Card

NEW LITERATURE

(Continued from page 122)

Crusher bulletin

PENNSYLVANIA CRUSHER DIV., Bath Iron Works Corp., announces a new bulletin describing the company's complete line of crushers. The bulletin illustrates and describes each type of crusher in the company's line, and indicates typical applications. It is a guide to preliminary crusher selection and is keyed into more detailed bulletins on specific crushers.

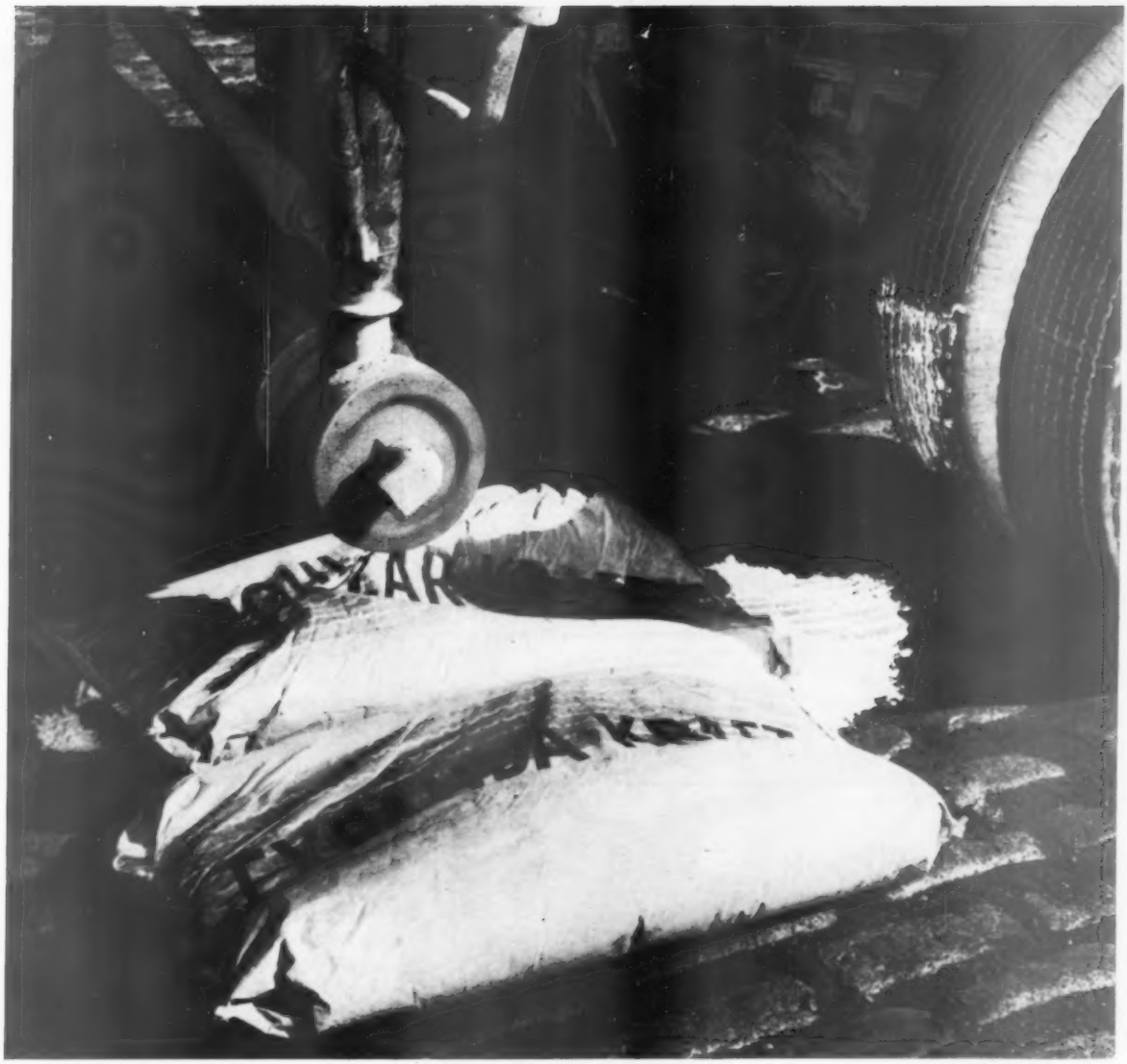
Enter 505 on Reader Card

Crawler-crane excavator

AMERICAN HOIST & DERRICK CO. has made available a catalog illustrating and describing the company's crawler-crane excavator. The air-controlled machine is in the 3½ to 4½ cu. yd. class, has a rated lifting capacity of 110 tons, and is capable of handling boom lengths to 270 ft., plus jibs. It has an 18 ft. ground clearance. To prepare for transport, only four bolts need be removed—one at the end of each axle—in order to slide off the side frame.

Enter 506 on Reader Card

(Continued on page 126)



One bag broke . . . the other has two-way stretch

The one with stretch is made of H&W's new, high-strength Expanda Kraft.

A large tractor-trailer ran over both bags of equal weight and plies. The regular kraft bag burst under pressure—see the tell-tale flour on the inside tire tread. But look at Expanda Kraft —*not a sign of breakage!*

Expanda Kraft is stronger, because it's made by a special roll-crepe process. It's resilient, has two-way stretch, and soaks up shock. And Expanda Kraft is available in white, semi-bleached and natural.

Expanda Kraft comes in 40, 50, 60, 70, 80 and 100-pound basis weights. *For samples and information,* write Hollingsworth & Whitney, Division of Scott Paper Company, Chester, Pa.

Safeguard your product in **EXPANDA KRAFT**®

HOLLINGSWORTH & WHITNEY DIVISION OF
SCOTT PAPER COMPANY

Enter 1021 on Reader Card

STEP UP PRODUCTION . . . PROLONG EFFECTIVE SCREEN LIFE

with Hanco ELECTRIC SCREEN HEATERS

- QUICK, EASY INSTALLATION
- TROUBLE-FREE OPERATION
- DUST PROOF
- LOW MAINTENANCE COSTS
- ADAPTABLE TO ALL SCREENS

START achieving maximum screening efficiency and continuous high tonnage production by installing proven HANCO SCREEN HEATERS which

STOP screen cloth blinding, costly shutdowns, screen damage and too-frequent replacement due to abusive mechanical screen-cleaning methods.

HANCO ENGINEERS will promptly analyze your requirements and make recommendations for more profitable screening of your products.

WRITE TO

F. R. HANNON & SONS

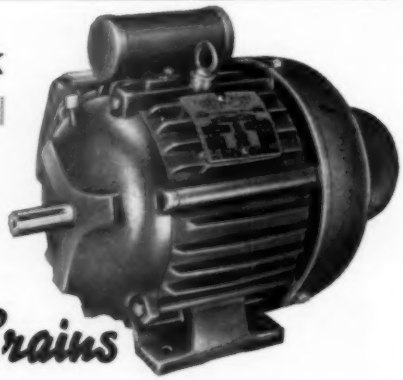
1605 Waynesburg Rd. SE., Canton 7, Ohio

CABLE ADDRESS: HANCO

Enter 1058 on Reader Card

this new Brook totally enclosed fan cooled, single phase motor has

Brawn and Brains



The BRAWN is in the rugged design, producing cool operation and long service life and in the housing, which keeps out dust and moisture . . . and the external fan which blasts cooling air over the heat dissipating fins on the housing.

The BRAIN is in the external centrifugal switch which positively disengages when motor has attained pre-set speed. Switch is on outside of motor for accessibility . . . just remove cap. No need to disassemble the motor or remove it from line for switch repairs. Same switch fits all sizes of motors . . . 1 to 5 HP.

You get real economy where dust, fumes or moisture are a problem. Dealers everywhere. Send for literature.

"World's Most Respected Motor"

BROOK MOTOR CORPORATION

3302-04 W. PETERSON AVE., CHICAGO 45, ILL.

IN CANADA: BROOK ELECTRIC MOTORS OF CANADA, LTD., 250 UNIVERSITY AVENUE, TORONTO

SINCE 1904

BROOK ELECTRIC MOTORS

Enter 1059 on Reader Card

NEW LITERATURE

(Continued from page 124)

Dust control bulletin

AMERICAN AIR FILTER CO., Inc., has released a composite product bulletin which describes the complete line of dust control equipment manufactured by the company. Discussing the four main types of dust control products—dry centrifugals, wet collectors, fabric collectors and electrostatic precipitators, the bulletin explains and illustrates 13 different company products, their capacities, and their specific applications.

Enter 507 on Reader Card

Study analyzes on truck fleet leasing

THE FOUNDATION FOR MANAGEMENT Research has published a new study that analyzes the merits and demerits of the main types of truck fleet leasing plans, and compares their cost with company ownership of truck fleets. It is entitled, "Truck Fleets: Lease or Buy? An Analysis of Truck Transportation Costs." The 32-page study is the third in a series on leasing which has been developed by the Foundation. The study is based on data gathered from corporations operating 12,817 company-owned trucks, and the records of national truck leasing companies. Four complete cost comparison tables are included.

Enter 508 on Reader Card

Welding training aids

HOBART WELDING SCHOOL has made available 50 welding training aids that are listed and described in a new folder. The listing includes books on a wide variety of welding subjects, welding charts, welding educational films, welding training aids, welding codes and welding specifications.

Enter 509 on Reader Card

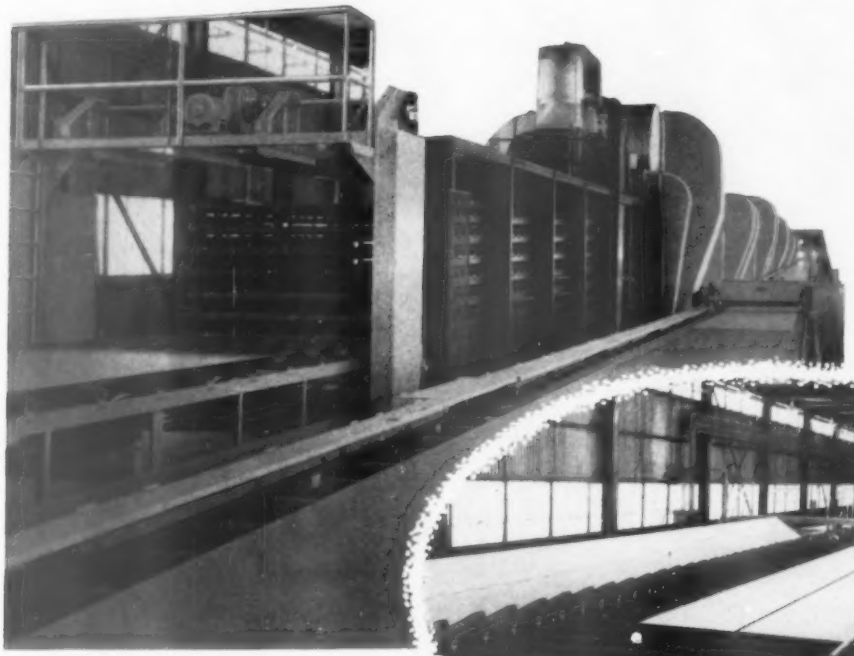
(Continued on page 132)

HIGH PRODUCTION ATTAINMENTS

for BESTWALL *at their new* BRUNSWICK, GEORGIA PLANT

WITH AN ASSIST FROM

COE



Boards coming down the setting belt are perforated in multiples up to 50 ft. in length and transfered as shown in the adjoining illustration ready for feeding into the Coe dryer. This is the largest transfer in operation today and was designed for Bestwall to aid them in improving their already high control standards.

Below is a view of the unloading end of the dryer where automatic equipment designed and built by Coe has been installed to keep manpower requirements at a minimum.

At Brunswick an 8 deck 5 zone steam heated Coe dryer approximately 575 ft. long has been daily handling ⅜" gypsum board being produced at the rate of 150 ft. per minute and above. Production goals of 1,000,000 sq. ft. per day are expected from this equipment.

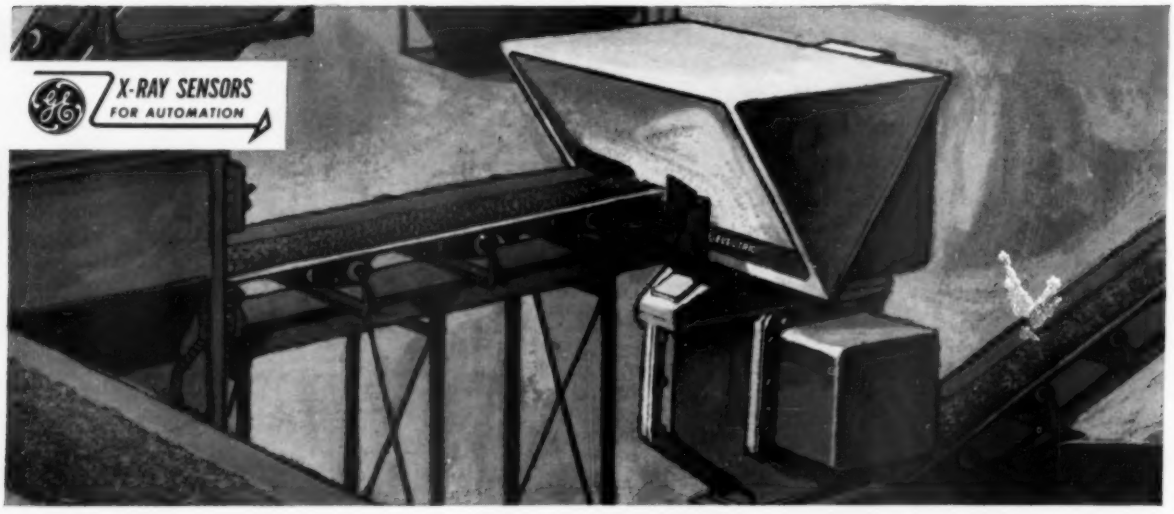
This installation is unique in that two boilers, and individual condensate pumps for each zone are used to permit exceptionally close temperature control. This is further evidence of Bestwall's unremitting effort to engineer their plants for maximum quality potential.

The **COE MFG. CO.**
PAINESVILLE, OHIO
PORTLAND, OREGON

Enter 1022 on Reader Card

"XEG" moves materials analysis

out of the lab...



onto the line!

General Electric's revolutionary X-Ray Emission Gage offers what amounts to an "on-line" *laboratory* for quality control. XEG performs continuous analysis of solids, liquids, liquid mixtures, slurries, powders, sheets, rods, wire or similar materials *during actual production.* It monitors up to 5 selected elements . . . maintains *moment-by-moment* surveillance, sensing both presence and quantity.

Expressly intended for the production line, XEG also is suited to individual sample analysis. Operation requires no scientifically trained personnel . . . facts on composition are delivered automatically, instantly, for rapid-fire feedback to process control.

You'll find uses of XEG as unlimited as the imagination! Discover how you can take full advantage of this remarkable innovation — get complete information now from your local G-E representative. Or write to X-Ray Department, General Electric Company, Milwaukee 1, Wisconsin, Room RP-114.

Progress Is Our Most Important Product

GENERAL ELECTRIC

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READER-SERVICE CARD

RP-11-60

ROCK PRODUCTS
79 W. Monroe St.

NOVEMBER, 1960
Chicago 3, Illinois

Cannot be serviced after January 1, 1961 postmark.

Please print or type

Name_____ Position_____

Company (In Full)_____

Company Address_____ City_____ Zone____ State_____

Send information on items identified by key numbers beside or below items of interest to you. List your choice in numerical order. Limit 10 per card.

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IF NO KEY NUMBER, USE COMPANY NAME

BUSINESS REPLY CARD
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PERMIT NO. 1417
CHICAGO, ILL.

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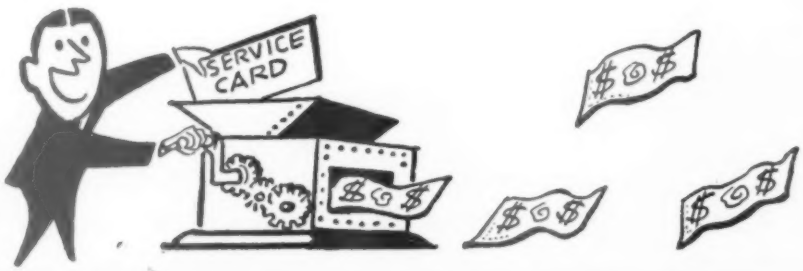
ROCK PRODUCTS
79 WEST MONROE ST.
CHICAGO 3, ILL.

MONEY-MAKING IDEAS FOR YOU - - - FREE

HOW TO USE THIS SERVICE

1. **Advertised Products**
2. **New Machinery**
3. **New Literature**

There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.



BUSINESS REPLY CARD

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PERMIT NO. 1417
CHICAGO, ILL.

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79 WEST MONROE ST.

CHICAGO 3, ILL.

READER-SERVICE CARD

RP-11-60

ROCK PRODUCTS
79 W. Monroe St.

NOVEMBER, 1960
Chicago 3, Illinois

Cannot be serviced after January 1, 1961 postmark.

Please print or type

Name_____ Position_____

Company (In Full)_____

Company Address_____ City_____ Zone____ State_____

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(6) ..... (7) ..... (8) ..... (9) ..... (10) .....

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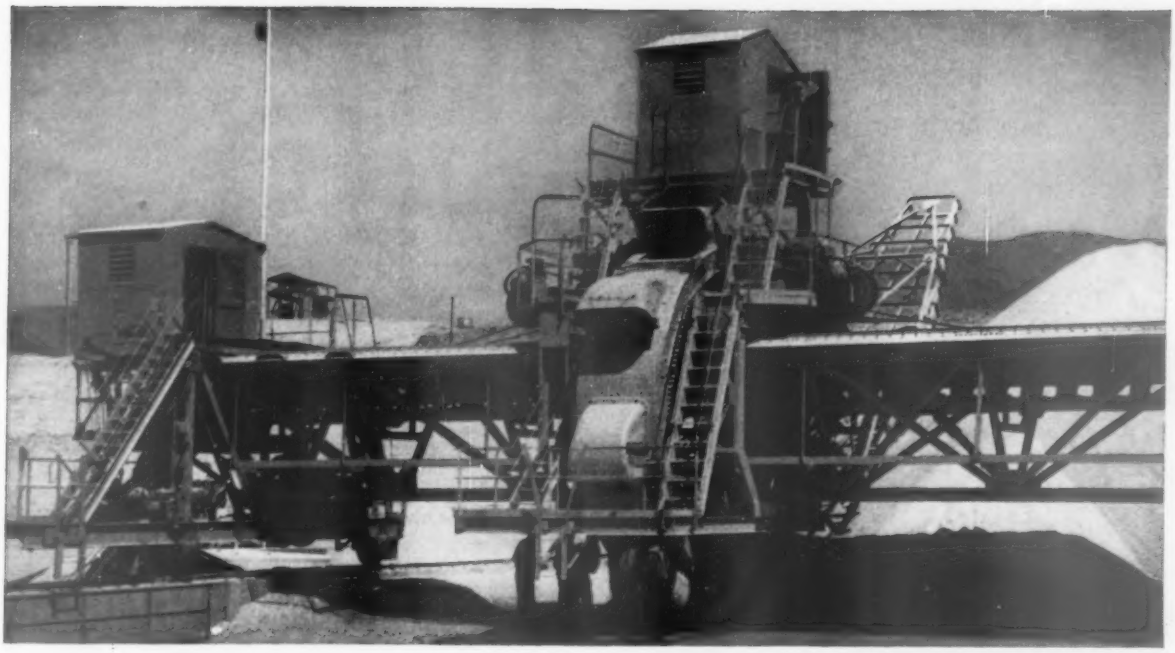
3. **New Literature**

There is a wealth of valuable information in the manufacturers' booklets offered in this issue. For your convenience, each advertisement, each new machinery and new literature item has been given a key number. Simply fill in the proper key number in the appropriate space on the card above and send it to us. We'll do the rest.



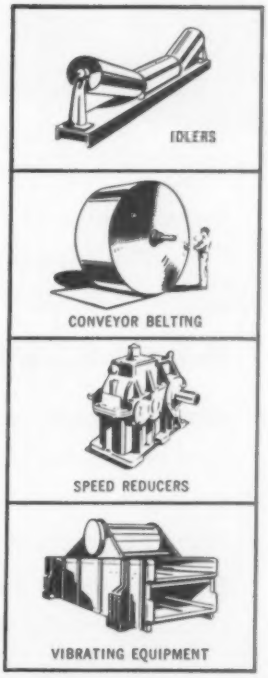
BIG WHEEL

It blends... it reclaims... it ends inefficiencies of selective mining

As part of a new H-R Rotary Bucket Wheel Blending and Reclaiming System, this giant 3-story wheel is capable of processing efficiently a broad range of materials . . . especially where more than one of the following typical situations exist:

1. Engaged in selective mining
2. Unable to comply with specifications
3. Too much coarse or fine material in feed
4. Storage pile requirements range 50,000 tons and over
5. Two or more types of raw material to blend for chemical compounding.

For full details consult your H-R representative, or write Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 11-19.

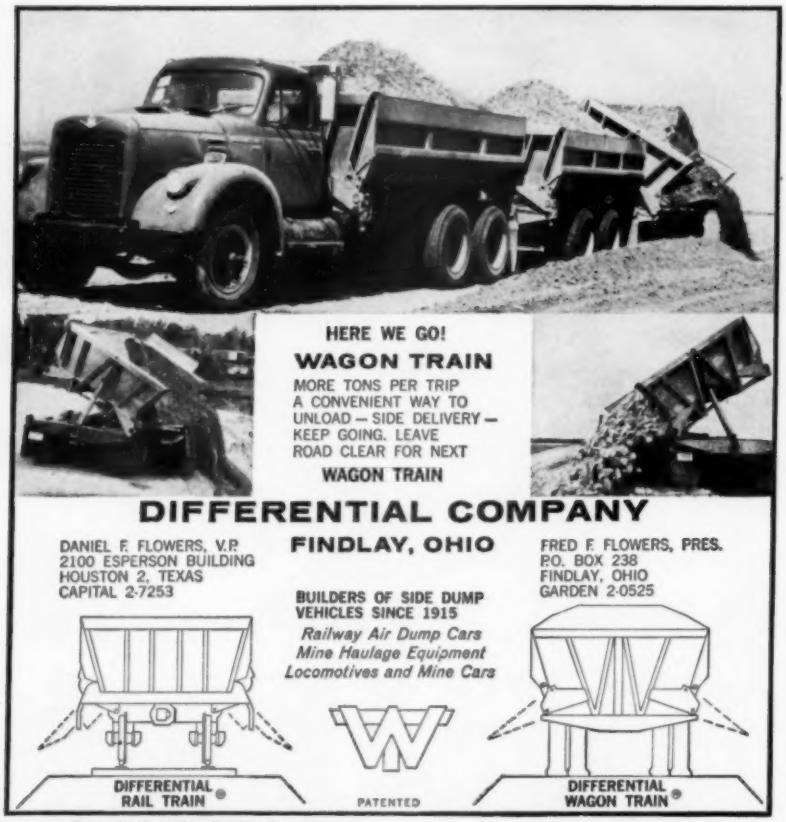


HR HEWITT-ROBINS

THE NAME THAT MEANS EVERYTHING IN BULK MATERIALS HANDLING SYSTEMS...

CONVEYOR BELTING AND IDLERS • INDUSTRIAL HOSE • VIBRATING FEEDERS, SCREENS & SHAKEOUTS • POWER TRANSMISSION EQUIPMENT

Enter 1025 on Reader Card



Enter 1060 on Reader Card

MEMO

To PRODUCERS

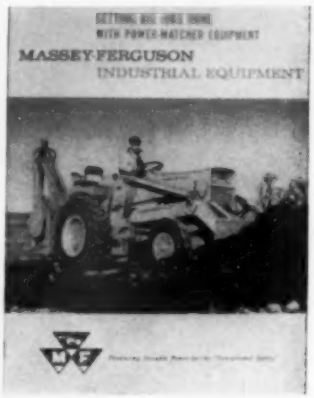
Just checking . . . . have you noticed the advertisements which apply to your operation?

ROCK PRODUCTS Advertisers regularly keep you well informed concerning both new equipment and processes.

Why not glance through this issue again to make sure nothing of importance to your business has missed your attention.

NEW LITERATURE

(Continued from page 126)

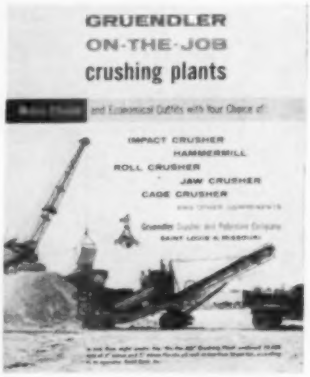


Industrial equipment

MASSEY-FERGUSON INDUSTRIAL DIV. has published a 24-page full-color catalog-type brochure showing the company's entire industrial equipment line. Action photographs, cutaway drawings, operating information and specifications material on the various items in the company's industrial line are covered in the brochure.

Enter 510 on Reader Card

Crushing plants



GRUENDLER CRUSHER & Pulverizer Co. has made available an illustrated bulletin that features the company's line of mobile crushing plants. There is a choice of impact crusher hammermill, roll crusher, jaw crusher, cage crusher and other components. The crushing plants are for all types of rock and gravel jobs, custom assembled to the customer's preference and requirements. Also included in the bulletin is a listing of optional crushing equipment available from the company.

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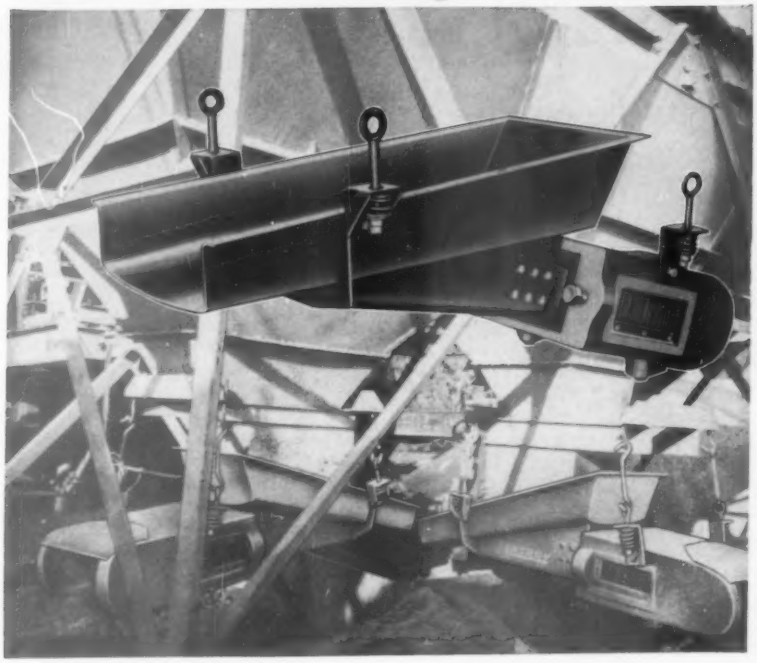
END

SYNTRON cost-cutting equipment of proven dependable Quality

feed stone at high TPH rates



SYNTRON *Vibra-Flow*

VIBRATORY FEEDERS

* * * feed rock, aggregate, sand and other bulk materials at rates from pounds to thousands of tons per hour.

SYNTRON Vibratory Feeders give you these features for lower cost production:

—dependable flow feeding of bulk materials to conveyor belts, crushers, screens, etc.

—instant flow control, the power of vibration is instantly controllable for more efficient material flow.

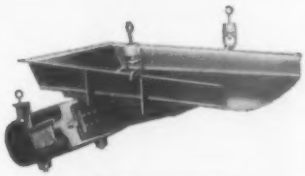
—durable and versatile, withstand heavy load shock and wear by abrasion. Compact, easily integrated into material handling operations.

—operation and maintenance economy—there are no mechanical wearing parts—no lubrication or periodic adjustments required.

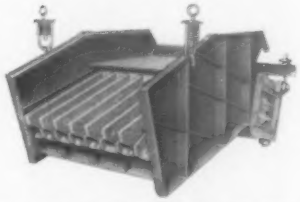
Install SYNTRON Vibratory Feeders for the dependable, low cost handling of all your bulk materials.

. . . write today for complete catalog data

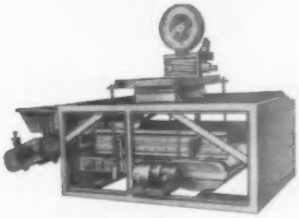
Other *SYNTRON* Equipment of proven dependable Quality



VIBRATORY FEEDERS



VIBRATING SCREENS AND GRIZZLIES



GRAVIMETRIC FEEDERS

VIBRATORY PACKERS

TEST SIEVE SHAKERS

SYNTRON COMPANY

450 Lexington Ave. *Quality Equipment Since 1921* Homer City, Penna.

Sales offices in principal cities in the United States and Canada—Agents in most Foreign countries

Enter 1026 on Reader Card

OUT-LASTS.. OUT-PERFORMS THEM ALL

for long-economical service get the...

CAPE ANALLOY
STEEL
DROP BALL

Extra life and wearability are FORGED into the "Cape Ann" Drop Ball for efficient, economical performance. FORGED and heat treated from tough abrasion resisting steel. "Cape Ann" Drop Balls are Sonic Tested before shipment and are fully guaranteed.

CAPE ANN
ANCHOR & FORGE CO.
P. O. BOX 361
GLOUCESTER, MASSACHUSETTS

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NEW PATENTS

by OLIVER S. NORTH

Sylvinite

U. S. 2,950,007—In the froth flotation of sylvite, **sylvinite** ore is subjected in the final stage of comminution to dry impact crushing. It is then dry screened and the oversize recycled, and only the undersize pulped, scrubbed, deslimed and subjected to froth flotation. This process reduces the amount of flotation feed and improves overall recovery of potash content. (to W. A. Smith & V. A. Zandon; assigned to American Metal Climax, Inc.)

U. S. 2,952,358—In the froth flotation beneficiation of **sylvinite,** the ore pulp is conditioned with a small amount of guar flour as a flocculant for insoluble impurities and as a clarifier and flotation modifier. (to E. A. Schoeld & J. M. Fritschy; assigned to Potash Co. of America)

Canadian 602,902 and British 840,-293—Method for producing from **sylvinite** ore a sylvite concentrate and recovering the flotation reagent from the sylvite. The coated particles are contacted with an aqueous alkaline solution to release the reagent. (to W. P. Wilson & T. M. Cramer; assigned to U. S. Borax & Chemical Corp.)

Canadian 602,677—In a skin flotation method for producing a concentrated, granular sylvite product which can be readily dried, the **sylvinite** ore is crushed and classified, and only the 6-28 mesh fraction subjected to skin flotation. (to E. A. Schoeld, J. D. Nabors & J. S. Reiter; assigned to Potash Co. of America)

Lime

U. S. 2,950,019 — Apparatus for charging vertical **lime** kilns. The containers discharge their contents in such a manner that horizontal layering of materials is preserved in the kiln. (to K. Beckenbach)

U. S. 2,950,206—A wall finish plaster comprises 64-79 percent **marble** powder, 2-4.1 percent **chalk,** 1.9-4.2 percent powdered dry slaked **lime,** 0.4-0.7 percent water-soluble ethyl cellulose, 1.5-3 percent **bentonite,** and the remainder water. (to J. O. B. Ostergren; assigned to Nyu Murbruksfabrikens i Stockholm Aktiebolag)

Canadian 601,486—This method and apparatus, particularly adapted for hydrating dolomitic quick **lime,** may be used for calcitic quick lime also. The material is hydrated without the use of superatmospheric pressures and with a very high degree of hydration. (to A. R. Allen; assigned to Kennedy Van Saun Mfg. & Eng. Corp.)

Gypsum

British 840,128—In the manufacture of **gypsum** board, a layer of gypsum plaster is applied to a slab of porour, fibrous base material. Then a fabric web is laid on the plaster, followed by a flexible plastic material. (to D. W. Harabour & J. L. Harvey; assigned to R. A. Brand & Co., Ltd. and Gyproc Products Ltd.)

Diatomite

U. S. 2,946,755—In the production of a **diatomite** filter aid product from either calcined diatomite or spent filtercake from the filtration of raw sugar liquor, the organic-bearing diatomite is heated at 700-1100 deg. F. in limited air to carbonize the organic matter and then fired to 1200-1800 deg. F. in the presence of air to completely oxidize the carbonized matter. (to C. A. Frankenhoff)

British 838,679—Use of **diatomite** as the preferred abrasive in an emulsified composition for use in polishing household enamelware, automobile bodies, etc. (assigned to Simoniz Co.)

END

*Copies of United States patents are available at a cost of 25 cents each (photostat copies of foreign patents at 30 cents per page) from The Commissioner of Patents, Washington 25, D.C. For convenience, coupons, each good for one copy of any patent, may be purchased from that official at the rate of $5.00 per 20-coupon pad or $25.00 per 100-coupon pad.

E-M-pioneered Incher provides quick, safe spotting of mills. It turns mills literally inch-by-inch to desired position merely by pushing a button. One E-M Incher Control can be used to spot several mills.

At Carbon Limestone Company...

"E-M INCHER SAVES US $1,600 A YEAR"

... cuts starter maintenance by over 90%

● At Carbon Limestone Co., Hillsville, Pa., a limestone pulverizing mill must be stopped and spotted every four hours for lubrication. Spotting formerly took about 15 minutes and was done by "jogging" (flicking the starting switch to give the mill a momentary jolt of power). This slow, "hit-and-miss" method resulted in frequent production halts for repairs to the overworked starting system.

To remedy this situation Carbon Limestone installed an E-M Incher. Result: Push-button spotting requiring only *one minute.* In the words of General Superintendent U. F. Masson:

The E-M Incher ... "*Increased productive hours of pulverizing mill 30 minutes in each 8 hours or 6¼%. Reduction of maintenance of starting equipment 90%.*"

The E-M Incher can save you big money, too, if you are now using one of the old, time-consuming methods of spotting synchronous motor driven mills.

Write the factory now for complete information about the Incher, and call your nearest E-M Field Engineer.

This mill at Carbon Limestone Co. is quickly positioned by the E-M Incher Control shown in the large illustration.

E-M

3100-TPA-2151

ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA

Specialists in making controls do
EXACTLY WHAT YOU WANT THEM TO

Enter 1024 on Reader Card

NEW MACHINERY

FOR FREE INFORMATION on these items, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue

Single-rotor impactor

Exceptionally uniform product gradation with a minimum amount of fines is promised with a newly developed impactor. Working in Illinois limestone the unit maintained a steady output of better than 175 tph. of minus 3 in. product with less than 21 percent minus $\frac{3}{16}$-in. fines. Peak production of 210 tph. has been recorded in the setup.

This capacity can be attained with the several innovations and unusual features of the new impactor. Double reversible rotor hammers can be turned 180 deg. as well as end-over-end to give four wearing surfaces instead of the usual two. The extra-rigid $8\frac{1}{2}$-in. diam. shaft is mounted in double row roller bearings. An oversize feed opening can accept slabby rock without bridging.

Two sizes are offered now, the 40 x 36-in. unit above, and a 45 x 48-in. model. They may be obtained as stationary, skid-mounted or portable units. (Lippmann Engr. Works, Inc., 4603 W. Mitchell St., Milwaukee, Wis.)

Enter 100 on Reader Card

Vibrating mill

A new 30-in. diam. vibrating mill is the second unit in a line offered to replace tumbling mills. With an internal volume of about 12 cu. ft., the entire unit—complete with motors and base—takes only about 66 sq. ft. of floor space.

While initial cost of the unit is about two-thirds that of a unit of comparable capacity, it will outproduce it up to 30 times, according to the manufacturer. The new mill is powered by a pair of 50-hp. motors acting through a dual eccentric drive mechanism. It is ideally suited for grinding a number of products typical of the rock products industry, including silica, barite, limestone, mica, dolomite, lime and shale. (Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.)

Enter 101 on Reader Card

Portable scales

Portable scales are available in a wide range of capacity and platform lengths, from a small 8 x 10-ft., 15-ton unit, to a 12 x 70-ft., 100-ton, tandem-connected unit. Whatever the size, each is a self-contained scale that can be readily moved over the highway from one location to another. The all-steel unit is then placed on simple concrete footers.

Dial scales registering beam or printed record, can be supplied with each scale. Each is designed to be extended in length and to have its capacity increased up to the maximum. (Toledo Scale Corp., Toledo 12, Ohio)

Enter 102 on Reader Card

Rail car heaters

Frozen hopper-bottom railroad cars can be cleaned quickly and economically with a newly introduced electrical radiant heater. Two units are used in each installation. Each unit is placed between the rails under the cars, and the heat from the 32-kw. 240-v. elements quickly clears the bottom of the car of ice or frozen materials. Each weather-tight frame is 44 x 22 in. and contains 16 alloy heating elements. (Radcor, Incorporated, Bradner, Ohio)

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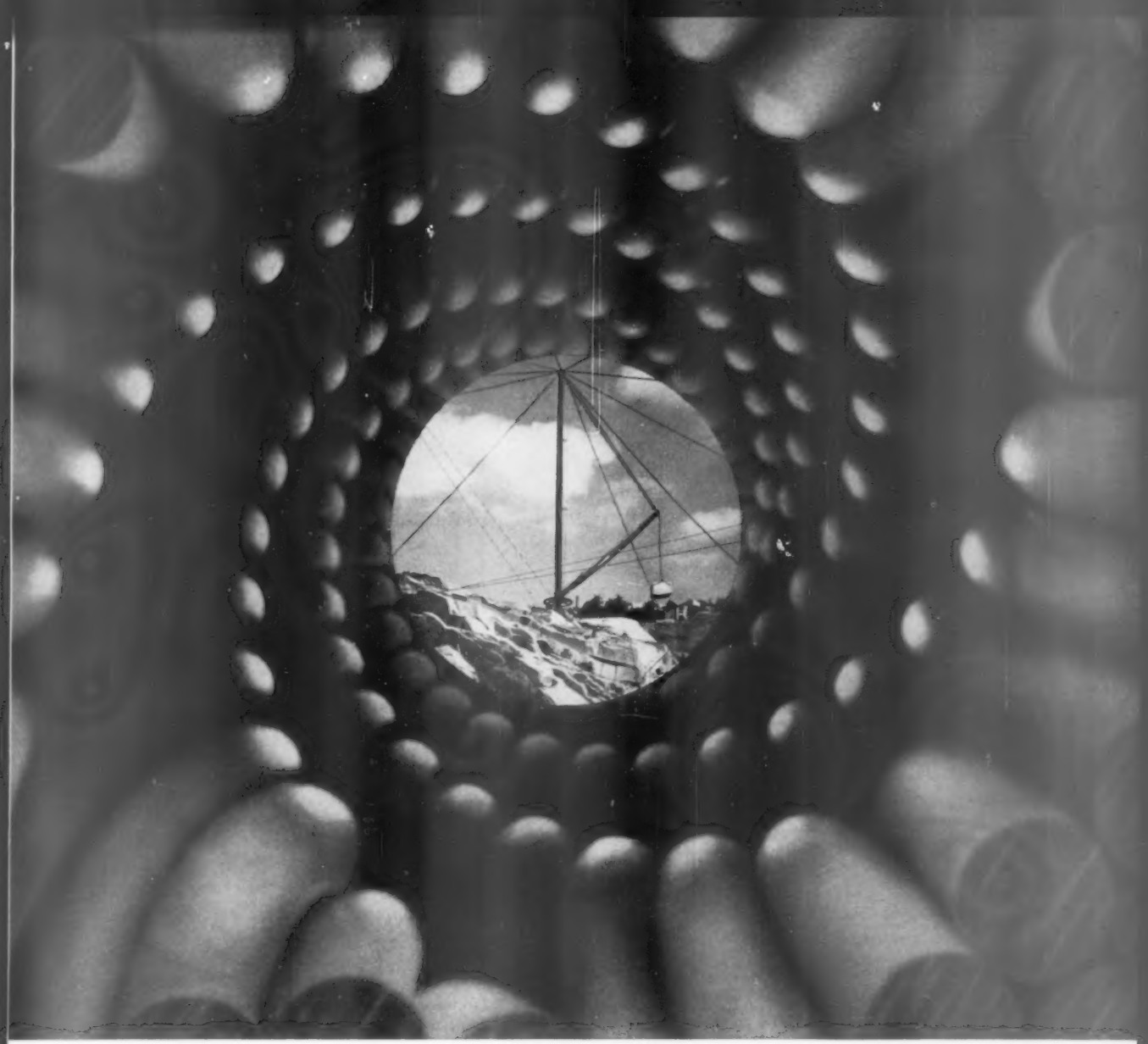
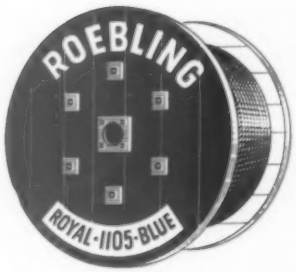
Please turn to page 138

Enter 1052 on Reader Card



ROEBLING ROYAL BLUE WIRE ROPE

WE PUT A LOT OF WORK INTO IT—YOU GET A LOT OF WORK OUT OF IT



This happens to be the inside view of Roebling Royal Blue — its core has been removed to show the uniformity and symmetry of the rope structure. You see how concerned we are with internal security.

We have to be. To make sure that Royal Blue will live up to the day-to-day demands made upon it. High stresses and unavoidable overloads, abrasion, fatigue, impact, crushing, sheave pressures and abusive drum-winding, to name the major ones.

Royal Blue goes through many inspections and tests—both internal and external —before reporting to work. This way we're sure that the rope we build will do what we sell it to do. These quality-control measures are your assurance that Royal Blue is made to save you money — anyway you look at it.

For details about hard-working Royal Blue, ask your wire rope distributor or write Roebling's Wire Rope Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities • John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

Clamshell bucket

A new addition to this maker's line of clamshell buckets offers efficient handling of the heavy materials in the rock products industry. Capacity of the new bucket is 4½ cu. yd., and it has proven itself when handling iron ore, fluorspar and clay out of ship bottoms. Height of the bucket is 13 ft., and it weighs 17,300 lb. empty. (Erie Strayer Co., 1851 Geist Rd., Erie, Pa.)

Enter 104 on Reader Card

Personnel dedusting unit

A newly developed cleaning unit should be useful to remove dust from the clothing of workers in cement, silica, lime and crushed stone plants. The Bassaire man-cleaner is a compact, free-standing cabinet complete with ducts, fans and filters.

Air jets in the cabinet disturb the dust on a man's clothing. Then the dusty air is drawn out, filtered and discharged to the outside air. The cycle can be repeated. The volume and direction of the air jets can be controlled to produce the most efficient dedusting. (J. R. Mott Ltd., 92 Royal York Rd. N., Toronto 18, Ont., Canada)

Enter 105 on Reader Card

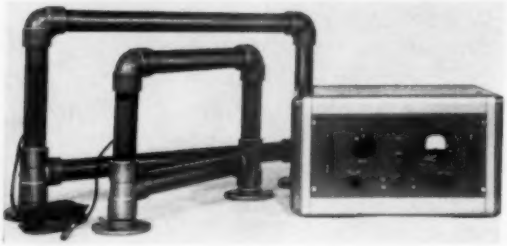
Rugged pillow blocks

Two new series of heavy-duty roller bearing pillow blocks are offered for the rugged service in the rock products industry. These are available for shaft sizes ranging from $1\frac{15}{16}$ to $7\frac{15}{16}$ in. All sizes are designed for mounting on shouldered shafts, but with adapter sleeves they can be used on standard commercial shafting. Each pillow block can be either fixed or floating merely with the insertion or removal of a spacer ring. End plugs permit the bearings to be closed at one end when the shaft does not extend through the housing.

One series is available with two-bolt bases, the other with four-bolt bases. Stress-relieved cast iron construction is standard, but alloy steel or ductile iron can be supplied for particularly severe applications involving impact or vibration. Both series are fitted with self-aligning spherical roller bearings that roll in oil or grease, and they can be adapted for circulating oil or oil mist lubrication. (The Torrington Co., Bantam Bearings Div., South Bend, Ind.)

Enter 106 on Reader Card

Metal detector



A new electronic metal detector can sense the presence of either magnetic or non-magnetic particles to prevent product contamination or machinery damage. This non-magnetic feature is particularly important with the wider use of stainless steel, aluminum and other non-magnetic metals in the rock products industry.

The Metabloc Metal Monitor consists of a search coil and a control unit. The coil is installed around a belt conveyor or weighing feeder. Any metallic object within the field will produce a signal that is amplified to trigger an alarm, stop the conveyor or actuate a marking device. (Morehouse Machine Co., 1742 Sixth Ave., York, Pa.)

Enter 107 on Reader Card

High-temperature dust collector

Custom-made glass fiber bags are the heart of a new dust collector for high-temperature applications. The bags are designed to handle dust laden gas at 550 deg. F. Collecting units are offered in a range of sizes from 1,980 to 17,825 cfm. in single units, and for either continuous or intermittent operation. The cylindrical bags are collapsed pneumatically to dislodge the accumulated dust. (American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.)

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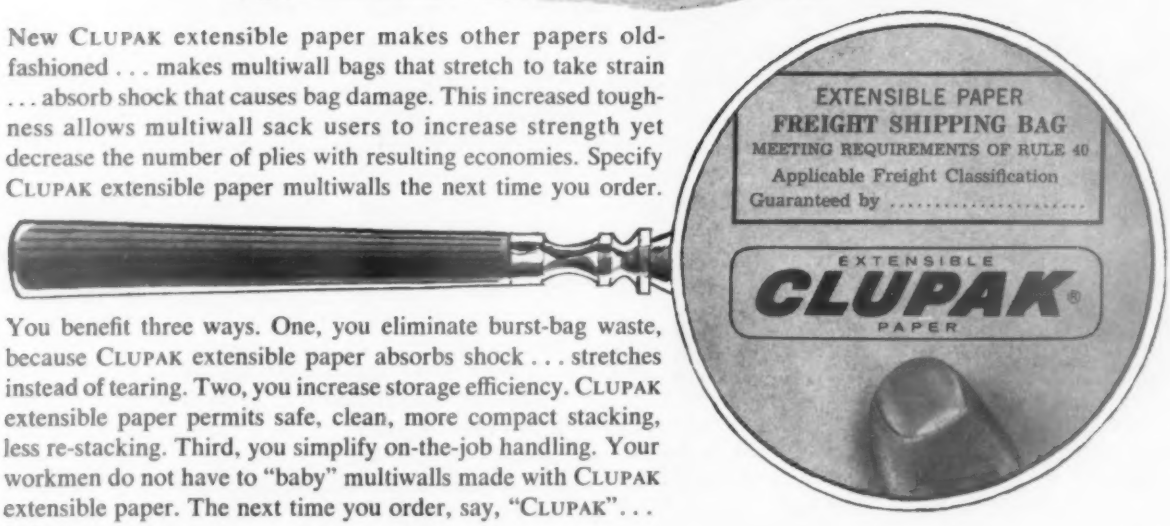
Please turn to page 140

ELEMENTARY...IT'S A EXTENSIBLE CLUPAK® PAPER* MULTIWALL BAG ...THAT'S WHY IT DIDN'T BREAK!

New CLUPAK extensible paper makes other papers old-fashioned . . . makes multiwall bags that stretch to take strain . . . absorb shock that causes bag damage. This increased toughness allows multiwall sack users to increase strength yet decrease the number of plies with resulting economies. Specify CLUPAK extensible paper multiwalls the next time you order.



You benefit three ways. One, you eliminate burst-bag waste, because CLUPAK extensible paper absorbs shock . . . stretches instead of tearing. Two, you increase storage efficiency. CLUPAK extensible paper permits safe, clean, more compact stacking, less re-stacking. Third, you simplify on-the-job handling. Your workmen do not have to "baby" multiwalls made with CLUPAK extensible paper. The next time you order, say, "CLUPAK"... before you say paper.

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications. Clupak, Inc., 530 5th Ave., N. Y. 36, N. Y.

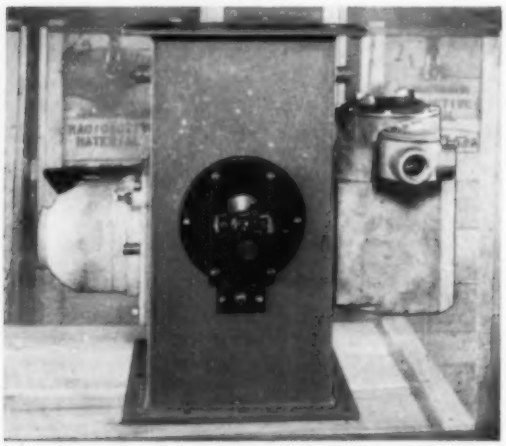
Enter 1027 on Reader Card

High-frequency screen

A custom built, high-frequency vibrating screen is offered for a number of difficult fine screening problems. Each unit is engineered to meet specific individual requirements, and each is equipped with the necessary dust enclosures, hoppers, feeders and screen heaters. The screen frames and screen cloths can be made in stainless steel, aluminum or carbon steel. An all-welded frame supports a special high-frequency vibration motor, normally a ⅓-hp., 3,600-rpm. unit. (Derrick Mfg. Co., 590 Duke Rd., Buffalo 25, N.Y.)

Enter 109 on Reader Card

Nuclear density gauge



Nuclear gauges are now offered for density and level control of dry solids. This is said to be the first time that a gauge using a nuclear source has been successfully used for dry applications. First unit made will meter the flow of raw mix materials going to a cement kiln, providing a basic measurement for close control of rotary kiln operation.

In contrast to liquid measuring gauges that use gamma ray sources, the new dry density gauge will use the beta rays from a strontium 90 source. However, for some applications gamma rays will be used. Whatever the source of radiation, the entire unit is shielded and completely safe. (The Ohmart Corp., 2236 Bogen St., Cincinnati 22, Ohio)

Enter 110 on Reader Card

Lightweight television

A small, lightweight television camera is offered for applications with low light levels. The Model 81 has solved the problem of offering a television camera to industries without sufficient light for the larger cameras. Lightweight is accomplished by completely transistorized circuits. The 15-lb. unit is about 5 x 5 in. in section and about 22 in. long. (Dage Television Div., Thompson Ramo Wooldridge Inc., Michigan City, Ind.)

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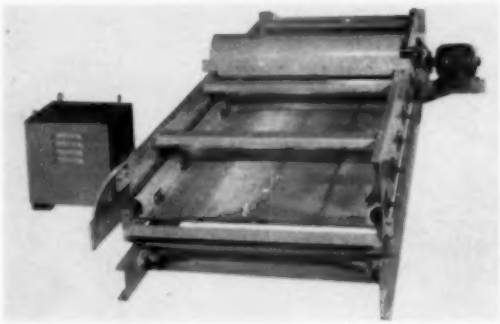
Heated vibrating screen



A new vibrating screen has been specifically designed for use with electric heaters. The 4 x 10-ft. screen comes in single or double-deck models with either or both decks adapted for heating equipment. Of course, the screens can be operated efficiently without heaters.

All parts of the screen are designed for electrical as well as mechanical efficiency. Heavy aluminum side rails provide conductivity in addition to strength for uniform mesh tension. Aluminum skirt bars hold the screen panels in place. Stainless steel screen cloths have copper shrouded edges, and each cloth segment is insulated from the other with a rubber strip.

Two heaters are offered, either 15 or 20 Kva. These are single-phase units each equipped with an 8-step tap switch. They can be connected to one side of any 60-cy. power line of standard voltage. (Universal Vibrating Screen Co., Racine, Wisconsin)

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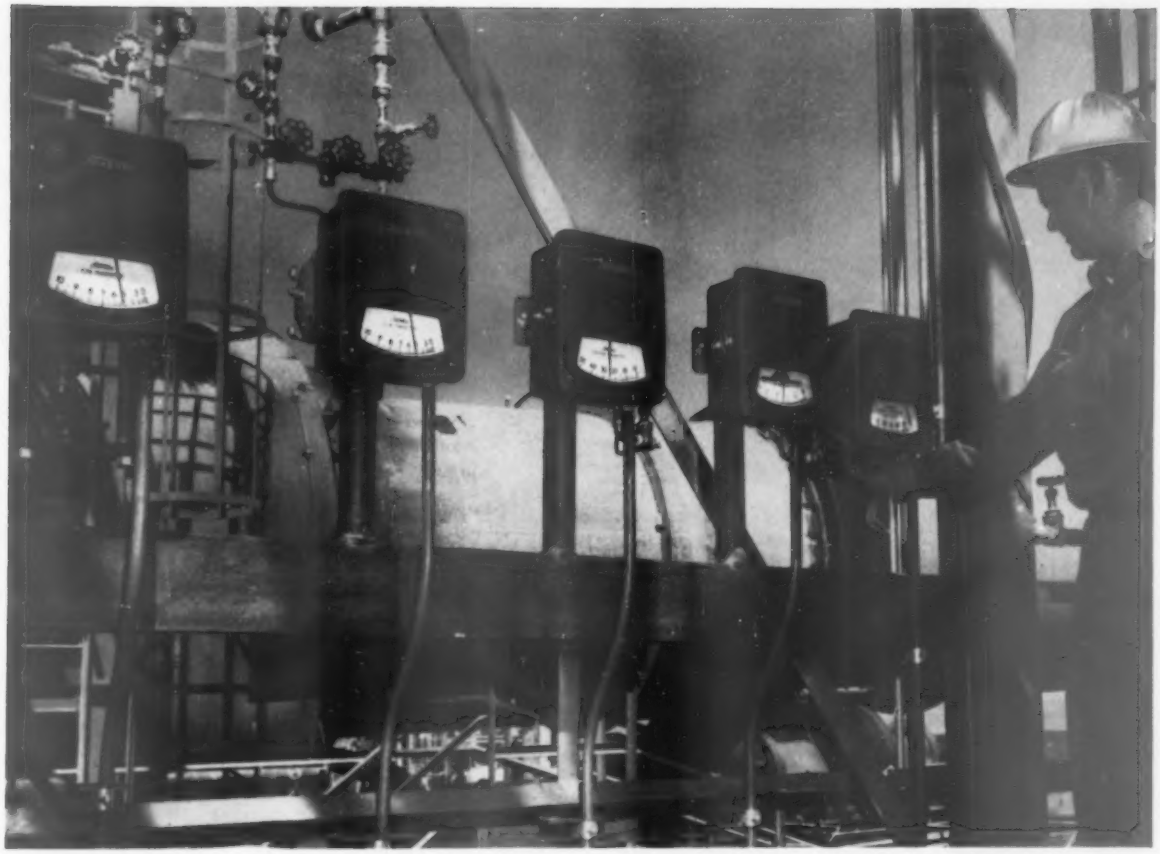


Type 630 indicating electronic Consotrol transmitter — shown here operating in a leading cement plant — may be equipped with any standard Foxboro measuring element. Transmitter continues to measure and indicate even in event of power failure.

Temperature, flow, pressure, speed, level — Foxboro Electronic Transmitters will measure and transmit them any place wires can go

For distances up to several miles, Foxboro Electronic Consotrol* Transmitters are the fastest, most accurate way you can transmit a measured variable.

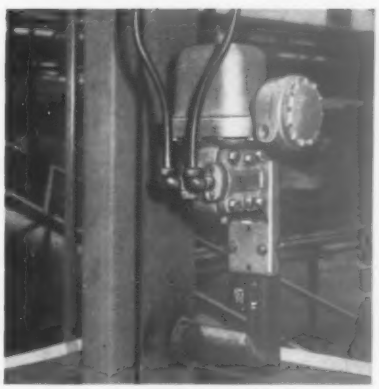
There's no transmission lag. Electric signals are transmitted instantly over two small, unshielded wires to centrally-located recorders and controllers.

Both the Foxboro Indicating and Force-Balance Electronic Transmitters have no vacuum tubes to burn out. Instead, dependable, solid-state components are used throughout to insure years of trouble-free operation.

Zero and span settings are simple mechanical adjustments. And your present personnel will need no special training or skills to operate them.

Foxboro Electronic Transmitters can be mounted anywhere — in any position. Heavy-gauge, tight-gasketed cases completely protect them from dust and weather.

Ask your Foxboro Field Engineer how they can help improve the efficiency of your operation. Or write for Bulletin 21-10 — it tells the whole Electronic Consotrol story. The Foxboro Company, 8311 Neponset Ave., Foxboro, Massachusetts.



Type 613 d/p Cell* transmitter combines simplicity and accuracy of force-balance with speed and convenience of electrical transmission. Requires no power supply at the transmitter.

Reg. U. S. Pat. Off.

FOXBORO

REG. U.S. PAT. OFF.

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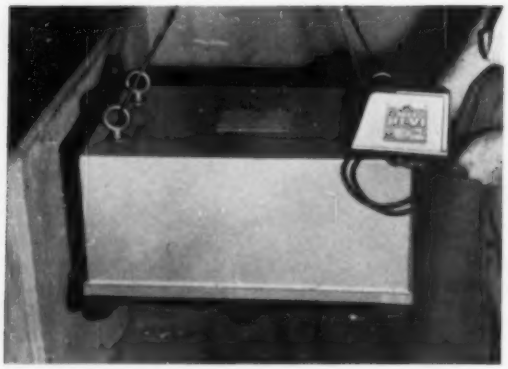


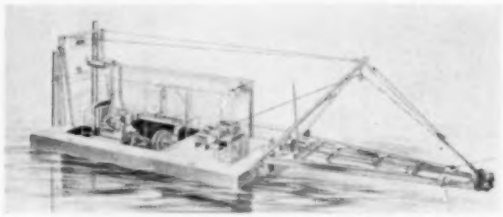
Heavy-duty vibrator

A newly developed vibrator is offered especially for moving large amounts of hard-to-handle materials through chutes and through enclosed bins or bunkers. At the same time, this vibrator is said to be easily installed on chutes, hoppers and bin walls up to ½ in. thick. The Model 70 U is simply bolted to the steel and plugged into any convenient 60-cycle outlet. No special accessories are needed.

The effectiveness of the new vibrator is achieved by a double-impact system in which the hammer strikes an anvil at both top and bottom of the stroke. With 60-cycle current this is the equivalent of 7,200 blows a minute against the bin wall. At the same time, relative quietness is assured with the use of semi-resilient impact elements. (Eriez Mfg. Co., Erie 6, Pa.)

Enter 113 on Reader Card

Portable dredge



A new portable dredge is equipped with electro-hydraulic controls to assure ease of handling without operator fatigue. Claimed to be the most advanced dredge in its class, the new design features a two-piece hull that can be quickly dismantled for transport, a hydraulic cutter motor located above the waterline and an exceptionally large control house. This permits ample space for maintenance, ventilation and personal safety. (Ellicott Machine Corp., Baltimore, Md.)

Enter 114 on Reader Card

for better washing . . . dust control . . . concrete curing

SPRAY NOZZLES

from Spraying Systems Co.

- complete choice of types and capacities to fit your job
- greater efficiency with minimum volume of water

Proper distribution and impact for washing . . . or proper atomization for dust control and concrete curing without unnecessary wetting . . . these are just some of the advantages of having a complete choice of spray nozzle types and sizes to fit your job. For complete information write for Catalog 24.

SPRAYING SYSTEMS CO.
3 ° RANDOLPH STREET
BELLWOOD, ILLINOIS

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Manufacturers Since 1885—"BEST BY EVERY TEST"

250 TONS HOURLY! -- Crushing number 8 hard Illinois limestone - 90% passing ½" screen

GRUENDLER PORTABLE 6XC SERIES IMPACTOR PLANT

Specially Designed Plant for low cost, high production of specific sizes of aggregates. The hard Illinois limestone to Customer Vibrator Grizzly Screen feeds to Low Level Belt Type Conveyor to Gruendler 6XC Impactor with Delivery Conveyors to Customer Finishing Vibrator Screens and Bins for convenient, fast loading by Trucks. The sturdy Unit features a Low Bed Chassis with Diesel Power Unit-7. The Gruendler Portable Impactor and Screening Plant is seldom equalled in high performance tests. Write for Bulletin on Portable Equipment for Rock and Gravel Crushing, Screening, Washing and Material Handling, and information data form, so you can give us full information including aggregate sizes and capacities wanted.

GRUENDLER CRUSHER & PULVERIZER CO.
Dept. R.P. 1160, 2915 N. Market St., St. Louis 6, Mo., U.S.A.

Enter 1072 on Reader Card

Conversion rectifier

Electrostatic precipitators can now be converted from mechanical to silicon rectifiers without replacing the entire power pack. A new conversion unit consists of four independent rectifier units with two racks of silicon diodes immersed in dielectric fluid. A choke in the line protects the assembly from high-voltage feedback.

The new conversion unit costs about 35 percent of a new power pack and can be installed in about 8 man-hours. It ties in readily with existing equipment, and one man can handle all parts, new and old.

Advantages of converting from mechanical to silicon rectifiers include elimination of maintenance and down-time costs, elimination of a large spare parts inventory and up to 25 percent greater electrical efficiency. (Buell Engr. Co., Inc., 123 William St., New York, N.Y.)

Enter 115 on Reader Card

Core drill

The maker of a new core drill offers the producer faster drilling, longer bit life and better all-around performance on the job. The D-series portable core drill achieves these advantages with a drill head that can be rotated a full 360 deg. a load indicator to indicate optimum pressure and operating speed at all times with overload protection for the motor.

Three models are offered: a hand-held drill for holes from ½ to 2 in., a portable drill for holes up to 6½ in. and one for holes up to 14 in. All can drill core holes on any surface at any angle. In addition to drilling through rock formations, the new drills can penetrate concrete, masonry and refractories. (Clipper Mfg. Co., 2800 Warwick, Kansas City, Missouri)

Enter 116 on Reader Card

Shirtpocket radio

Foremen, dispatchers and roving maintenance men can receive clear, loud signals from headquarters with this miniature receiver. It operates on the VHF frequencies assigned to mobile networks and is completely self-contained, including 140-hr. mercury cell batteries, speaker, volume control and built-in antenna.

The miniature size is made possible by the 17 transistors and 7 diodes built into the molded plastic case. Low current drain prolongs the life of the batteries. (Motorola, Inc., 4545 W. Augusta Blvd., Chicago, Ill.)

Enter 117 on Reader Card

Please turn to page 144

Merrick will unveil

a completely new line of

WEIGHTOMETERS® and FEEDOWEIGHTS®

at the Power Show

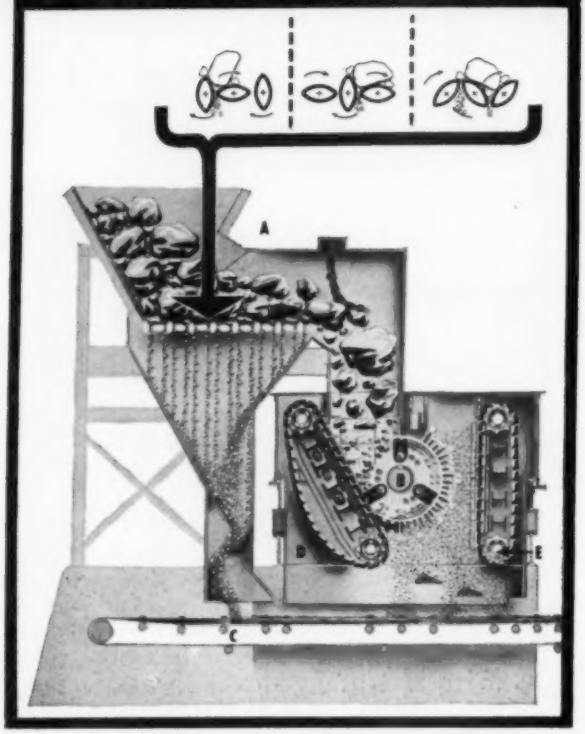
You are cordially invited to see this continuous weighing and proportioning equipment.

BOOTH NO. 416
NEW YORK COLISEUM
November 28 through
December 2, 1960

Merrick Scale Manufacturing Company
180 Autumn Street • Passaic, N. J.
More than fifty years of "firsts" in automatic weighing

Enter 1073 on Reader Card

New Wobbler Feeder-Hammermill combination



Increases capacity 50 to 100%

The exclusive Universal Wobbler Feeder (patented) and Bulldog Hammermill combination was engineered for one of the world's largest cement mills to average 600 tons per hour. It can increase *your* capacity up to 100%! Here's why.

The Wobbler Feeder (A) feeds the Bulldog Hammermill (B). Its tumbling, rocking motion sifts fines and clay through the bars to under conveyor (C). Only clean oversize rock is delivered to the Hammermill. The Wobbler Feeder scalps as it feeds without blinding or plugging, particularly valuable when wet, sticky material is a problem. Bulldog Hammermill's traveling breaker plate (D) and cleaning bar (E) eliminate build-up of sticky material in breaking chamber. Your crushing operation keeps going without clogging or jamming regardless of moisture present.

Since the Wobbler Feeder sends only oversize to the Bulldog Hammermill, the Bulldog can handle more material per day. Add this efficient, no-waste breaking power to the double, non-clog protection of this new combination and you can increase your production up to as much as 100%!

For the name of the Hammermill representative nearest you, write:

HAMMERMILLS, INC.

Subsidiary of PETTIBONE Mulliken Corp.

625 C Avenue N.W., Cedar Rapids, Iowa

Enter 1074 on Reader Card

NEW MACHINERY

continued from page 143

Hardening compound

The answer to many a maintenance man's fervent prayer may be a powder that hardens low-carbon steels up to 65 Rockwell C in one application. Apparently, the compound produces a case of graduated hardness from the surface to the interior of a steel part, producing toughness and ductility inside with carbide-like hardness on the surface.

A welding torch provides enough heat for most small parts. Thoroughly cleaned steel parts are merely heated to light cherry-red, plunged into the non-toxic compound, reheated and quenched. While Hard-N-Tough will probably find its most useful application for hardening low carbon steels, it can be used to advantage on high-carbon steels without producing decarburization and on alloy steel parts. (Hard-N-Tough Corp., Box 275, Huntington, New York)

Enter 118 on Reader Card

Glandless sand pump

Power and maintenance savings between 30 and 50 percent are offered with a new line of glandless pumps. The new SRL pump line requires no sealing water, and there is no slurry dilution. The passageway around the shaft sleeve is open to the atmosphere when the pump is in action. But when the pump is stopped, a centrifugal seal prevents leakage.

The glandless pumps are suitable for pumping sand or abrasive slurries. Each pump is fitted with moulded soft rubber lining and impeller. Ratings of the new line range from 180 to 2,700 gpm. of water at 60-ft. head. (Denver Equipment Co., 1400 17th St., Denver 17, Colo.)

Enter 119 on Reader Card

Hard-facing rod

A newly developed process for manufacturing tubular welding wire has produced a smooth, concentric wire with an extremely fast deposition rate. Four types are available to meet almost any heavy-duty hardsurfacing requirement in the rock products industry. These are listed as type A, B-X, C and D. Ranomatic A is offered only for submerged arc, semi-automatic hardsurfacing for applications up to 30 Rockwell C. The other types are for either submerged or open arc with hardness ranging up to 68 Rockwell C. All are available in 50-lb. cartons in coils 12 in. diam. (Rankin Mfg. Co., 616 S. Marengo Ave., Alhambra 2, Calif.)

Enter 120 on Reader Card

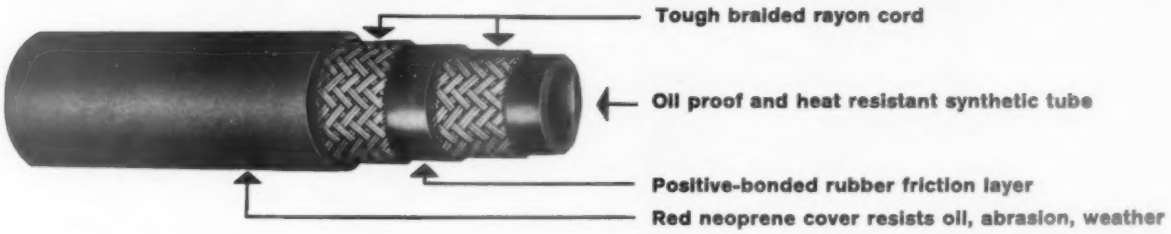
Please turn to page 146

Quaker Thermoid

VERSICON

All-Purpose Hose

The hose that wears like a truck tire!


Tough braided rayon cord
Oil proof and heat resistant synthetic tube
Positive-bonded rubber friction layer
Red neoprene cover resists oil, abrasion, weather

Work like this is rough on hose, but Thermoid-Quaker "Versicon" takes it in stride. "Versicon" hose is built for high air pressures, up to 300 psi. It's built to withstand dragging over jagged, abrasive rock. It resists oil, baking sun or freezing cold. It's the heavy gauge, tough neoprene cover that takes this kind of surface abuse.

The tough braided rayon reinforcement gives it the extra strength to withstand high working pressures.

The tube is a specially compounded synthetic that's oil proof, heat resistant and will not flake or chip.

"Versicon" is made in all sizes up to 1½" and in lengths up to 500' in some sizes. Also in one, two or three braid constructions for use with water, oil, grease, solvents, sprays and mild chemical solutions.

See your experienced Thermoid Division Distributor for the right hose for your requirements, or write: *Thermoid Division, H. K. Porter Company, Inc., 200 Whitehead Road, Trenton 6, N. J.*

THERMOID DIVISION PORTER **H.K. PORTER COMPANY, INC.**

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

Enter 1030 on Reader Card

FOOTE BROS.
SHAFT MOUNTED DRIVES
with Duti-Rated LIFETIME GEARING

SINGLE REDUCTION
Output Speeds: 90 to 420 RPM
Capacities: ¼ to 40 HP
DOUBLE REDUCTION FLANGE MOUNT
Output Speeds: 10 to 135 RPM
Capacities: 1 to 7 HP
DOUBLE REDUCTION
Output Speeds: 10 to 135 RPM
Capacities: 1 to 30 HP

High hardness, premium quality Duti-Rated Lifetime Gearing in Foote Bros. Shaft Mounted Drives gives them greater load carrying capacity with long service life. Quick, easy installation on driven shafts with diameters from 15/16" to 3-7/16" saves time, labor, eliminates need for couplings and adjustable motor mount. Built-in backstop to prevent reverse rotation.

Write for Shaft Mounted Drive Catalog.

FOOTE BROS. GEAR AND MACHINE CORPORATION
4589 South Western Boulevard, Chicago 9, Illinois

Enter 1075 on Reader Card

Slurries...handled at lower cost

The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

Buy WILFLEY for Cost-Saving Performance

A. R. WILFLEY and SONS, Inc.
Denver, Colo., U.S.A.

WILFLEY centrifugal PUMPS

Enter 1076 on Reader Card

WHAT ARE YOU PAYING FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

See the "WHERE TO BUY" Section

NEW MACHINERY

continued from page 144

Heavy-duty conveyor belt

The maker of this heavy-duty conveyor belt claims that it has at least 10 times the rip resistance of conventional belts with cotton duck plies. It also provides built-in protection against internal rupture under stress and offers exceptional resistance to cover separation. This has been achieved by the use of thousands of rubber rivets that penetrate deep into the woven carcass.

With tremendous impact resistance, outstanding troughing and tracking properties, resistance to edge wear and great strength under mechanical splices, the new belt is ideal for the heavy-duty conditions in the rock products industry. (The Goodyear Tire & Rubber Co., Akron 16, Ohio)

Enter 121 on Reader Card

Fineness tester for cement

A new device is available for determining the fineness of portland cement by the Wagner Turbidimeter test, according to ASTM procedure C-115.

The apparatus includes a light source of constant intensity that projects parallel rays of light on the sensitive plate of a photoelectric cell. These are mounted in a metal cabinet. In addition, a microammeter, wet screening assembly, sedimentation tank, flasks and stirring apparatus complete the testing tools. The current generated by the cell is indicated by the ammeter to give a direct reading of the suspended cement's turbidity or Wagner number. (Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill.)

Enter 122 on Reader Card

Bit grinder

Custom grinding of drill bits is now possible with a new series of bit grinders. The manufacturer claims that any detachable bit can be sharpened, up to and including 12 in. diam.

The three-bolt rectangular base plate can be secured to any bench, and it can be easily assembled and disassembled to be moved from one place to another. An indexing fixture makes it simple to grind either cross or X-bits. Both edges of the bit and the gauge can be precision ground to restore perfect cutting edges.

Different lengths can be sharpened by adjusting the height of the grinding head. Three types are available—for portable, bench or pedestal grinding. (Gardner-Denver Co., Quincy, Ill.)

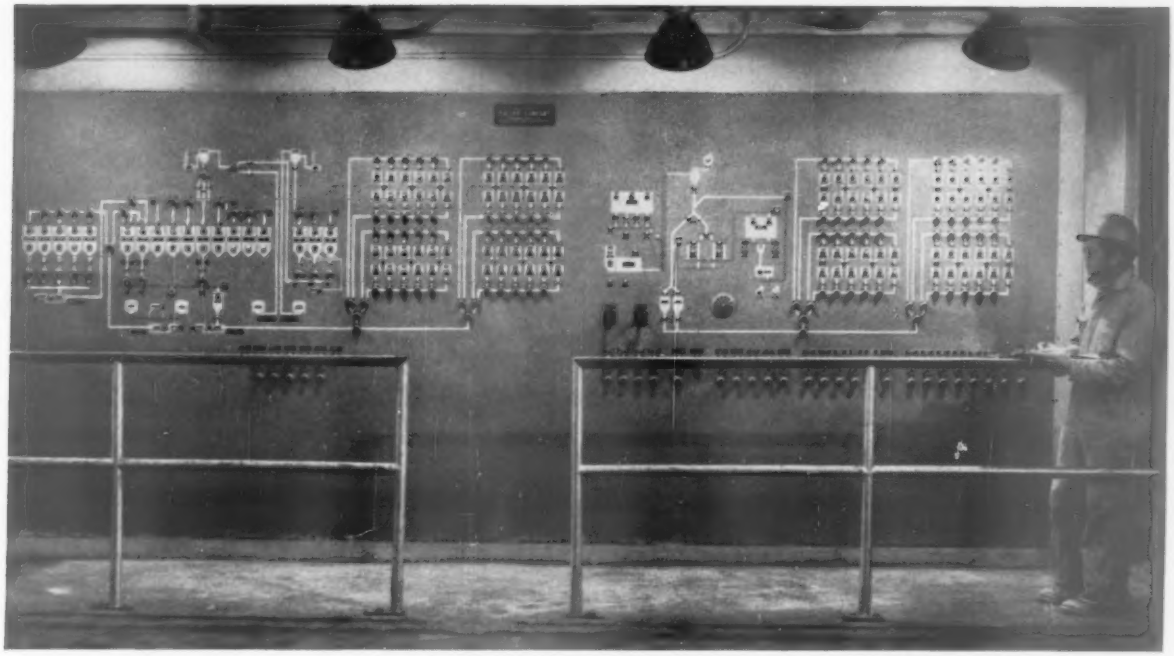
Enter 123 on Reader Card

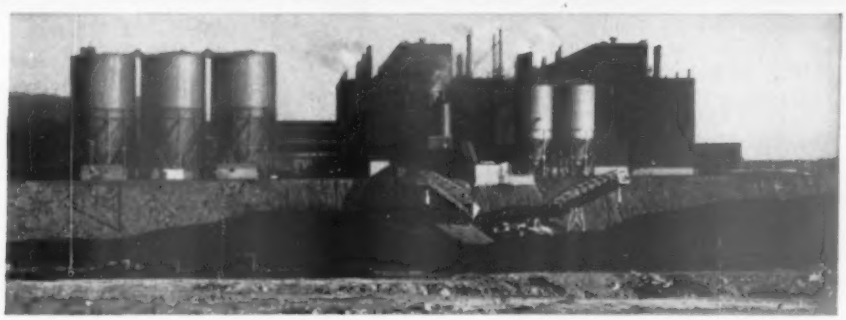
END

More "PAY-DIRT" With Fuller Panels In Control

One man on watch—and a Fuller Control Panel in control. Result: the flow of bulk, dry materials in a pneumatic conveying system graphically illustrated by diagrams and indication lights that track process transitions from phase to phase—without human errors!

Fuller Control Panels—automatic, remote, one-man control of multiple operations—stem from Fuller's vast materials handling and instrumentation experience. Fuller, the only manufacturer of pneumatic conveying equipment engaged in engineering and building its own control panels, puts its cumulative experience into each project. This single knowledgeable responsibility for both system and control means savings in time and costs. More important—it's your assurance that the total system is generic to your specific operational needs.





Look to Fuller's engineering-manufacturing team to develop the simplest possible control system without costly duplication or changes for you. Write for Bulletin G-9, today.

2635
CP-2

FULLER COMPANY
102 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Fuller
....pioneers in harnessing AIR

Enter 1031 on Reader Card

MANUFACTURERS NEWS

Smythe honored by Thew

CHAUNCEY B. SMYTHE, president of The Thew Shovel Co., was honored on the anniversary of his fiftieth year of service with the company. Distributors, employes, personal friends and business associates joined in the two-day program which included a dinner and reception in Mr. Smythe's honor. Mr. Smythe, who joined Thew in 1910 and became president in 1945, became the first person to reach 50 years of service with the company which was founded in 1899.

Clark offers equipment on trial basis

CENTRAL FLORIDA FIRMS considering purchase of new materials handling equipment can now try out the equipment for a free seven-day trial period under a new merchandising plan just announced. M. P. Whitmore, president of Whitmore Industrial Trucks, Inc., local dealer for materials handling equipment manufactured by Clark Equipment Co., said the plan will enable the buyer to make certain he has specified the proper equipment for the job before he has paid for it.

Under the plan, the buyer will provide a regular purchase order with the understanding between buyer and dealer as to what is expected of the equipment. If the equipment does not meet the expectations within seven days of delivery it is returned, at no cost to the buyer. Mr. Whitmore said Clark Equipment is the only handling equipment manufacturer offering a trial purchase plan.

Shiner & Wallace elected by Massey-Ferguson

TWO OPERATING EXECUTIVES were named to the board of directors of Massey-Ferguson, manufacturer of farm and industrial machinery. Elected to the board were John H. Shiner (left) and Harold A. Wallace, vice presidents of marketing and manufacturing respectively. Both Shiner and Wallace had key roles in an industrial conference held in Toronto. Industrial branch and regional managers of the company at the time conferred for three days on the growing emphasis on the Massey-Ferguson industrial line. All products in the industrial line were demonstrated.

Amer. Brake Shoe forms Indust. Castings Group

KEMPTON DUNN, president of American Brake Shoe Co., New York, N.Y., announced the formation of an Industrial Castings Group composed of four of the company's divisions, and the appointment as group executive of Paul L. McCulloch, Jr., who has been elected a vice president of the company. Mr. McCulloch will have over-all responsibility for the operations of the American Manganese Steel Div., Electro-Alloys Div., Engineered Castings Div. and National Bearing Div. Succeeding him as president of the company's Electro-Alloys Div., will be William D. Raddatz, who had been a vice president of the division. The divisions which comprise the new group manufacture a wide range of foundry products.

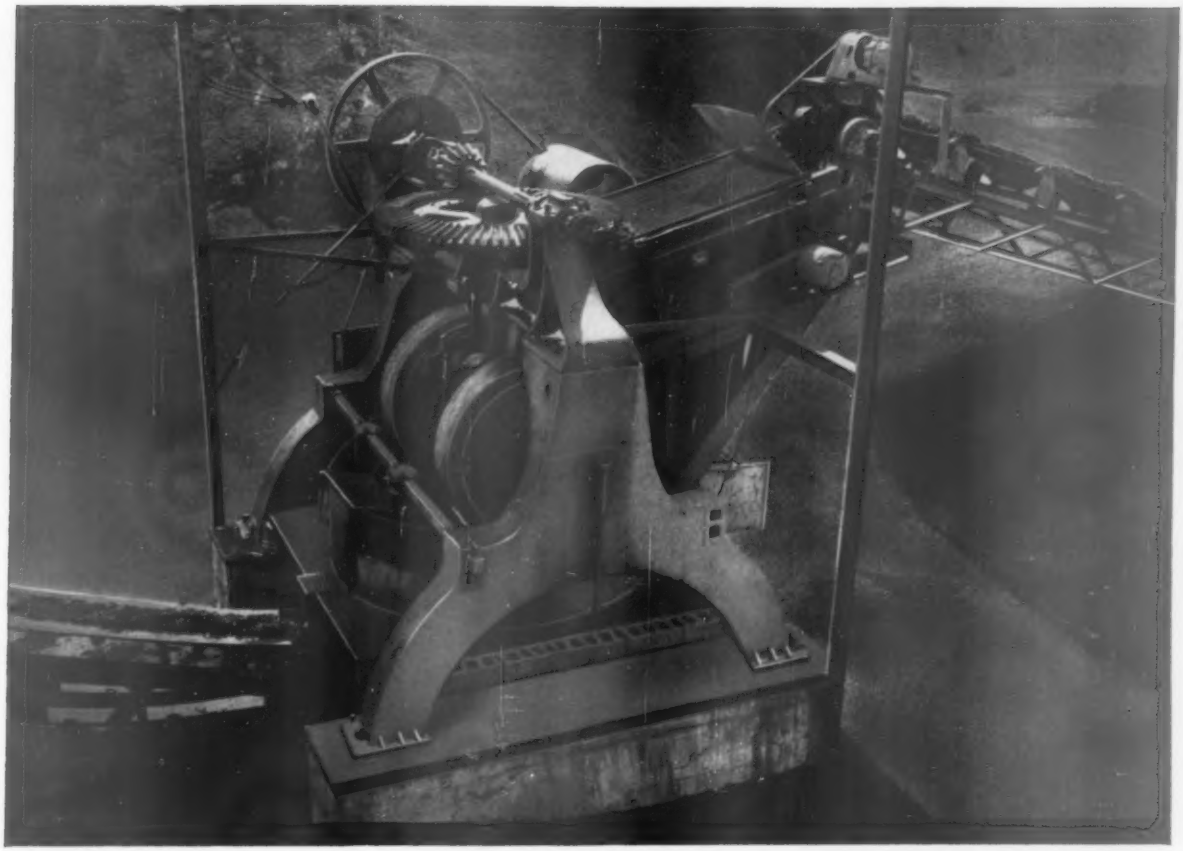
Atlas Copco acquires rock drilling firm

ATLAS COPCO A.B. has acquired the Swedish Diamond Rock Drilling Co., better known as Craelius. Mr. Heuser, president of Atlas Copco, gave no indication as to the immediate effect of this acquisition on the company's present United States sales operation. Craelius specializes in core drilling operations for testing soil, rock strata, mines and ore deposits. Headquartered in Stockholm, the international Atlas Copco group provides compressor and pneumatic equipment sales and service.

New office for U. S. Steel

UNITED STATES STEEL CORP., has opened a new slag products sales office at 208 S. La Salle St., Chicago 90, Ill., it was announced by S. H. Steffey, manager, slag products. G. M. Lakins has been appointed Chicago district representative, slag sales, and will be in charge of the new office. He will move to Chicago from Pittsburgh, Pa., where he has had extensive sales experience with U. S. Steel. Mr. Lakins stated that the office will help to develop new uses for the slag products.

(Continued on page 150)



MAINTENANCE COSTS REDUCED OVER 65%

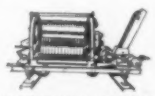
Wm. Moors Concrete Products, Inc., one of the larger producers of cinder and haydite blocks in the Detroit, Michigan area, cut grinder maintenance costs over 65% with the installation of this AMERICAN #9 GRINDER. The unit grinds cinders for over one and one half million cinder blocks a year.

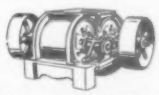
Hubert Moors, president, stated, "The AMERICAN #9 GRINDER is a rugged machine designed to give more production with a minimum of repair. Simplicity and ease of installation make it ideal for block plants."

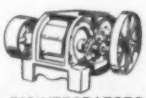
In addition to low maintenance the grinder features wet or dry grinding, no screen plates required, suspended mullers are adjustable to volume and size requirements, gears are long-wearing cast material, 25 horsepower required, volume up to 30 yards per hour.

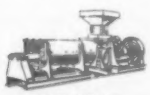
Before you buy—check the AMERICAN way.

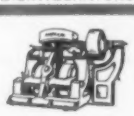
American
CLAY MACHINERY
A DIVISION OF
HUBER-WARCO COMPANY • Marion, Ohio, U.S.A.


ELECTRIC CUTTERS


SMOOTH ROLL CRUSHERS


DISINTEGRATORS


PUG MILLS


GRINDERS

COMBINATION DE-AIRING MACHINES

Enter 1029 on Reader Card

(Continued from page 148)

Yale & Towne elects Patterson president

GORDON PATTERSON has been elected president and a director of the Yale & Towne Mfg. Co., it was announced by Herbert G. Wellington, chairman of the executive committee of the board of directors. Mr. Patterson previously served as president of the Square D Co. He succeeds Gilbert W. Chapman, who retired after 11 years as president of the company. The firm is a manufacturer of lock and hardware products and materials handling equipment. Its operations include 14 plants here and abroad. Mr. Patterson continues as director of Square D and is also a director of National Malleable & Steel Castings Company.

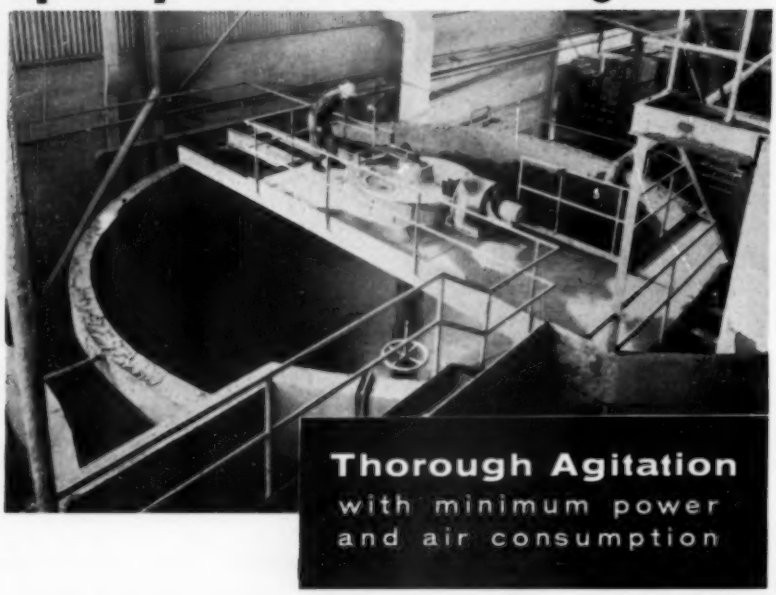
Conveyor Systems acquires Farquhar Div.

THE PURCHASE OF Oliver Corp.'s A. B. Farquhar Div. by Conveyor Systems, Inc., Morton Grove, Ill., offers a new combination line of standard and custom conveyor equipment for industry. The A. B. Farquhar Div. manufacturers standard conveyors for bulk and package handling, and Conveyor Systems, Inc. specializes in custom conveyor engineering and conveyor constructions.

All operations of Farquhar, located at York, Pa., were formally moved to Morton Grove, Ill., and manufacturing operations have begun in the newly enlarged plant of Conveyor Systems, Incorporated.

E. L. Weinthaler, as vice president and general manager of Conveyor Systems, will supervise operations of the CSI custom-engineered phase of the combined operation. C. W. King will continue to serve as general sales manager of the Farquhar Div.

Specify MANITOWOC Agitators



Look at the Manitowoc Agitator above, installed in a clay slurry tank 30 ft. in diameter and 25 ft. high. This is but one of dozens of Manitowoc Agitators found in the foremost cement producing plants, both in this country and overseas. These quality conscious operators depend on Manitowoc for complete, uniform and economical slurry agitation . . . *plus* design which permits the installation of agitators in tanks up to 100 ft. in diameter, or larger.

By combining mechanical and air agitation, Manitowoc Agitators maintain consistently uniform particle size and chemical analysis in any type of slurry *without* a continuous application of air. As a result, compressed air consumption and operating costs are substantially reduced. Combine this cost-saving feature with the exclusive Manitowoc Control Valve, scientific air pipe design with an improved check valve, and rugged, channel construction agitator arms and you have the finest slurry agitator for turning out highest quality cement at *your* plant. Write now for detailed, helpful information.

Manitowoc Shipbuilding, Inc.
MANITOWOC, WISCONSIN

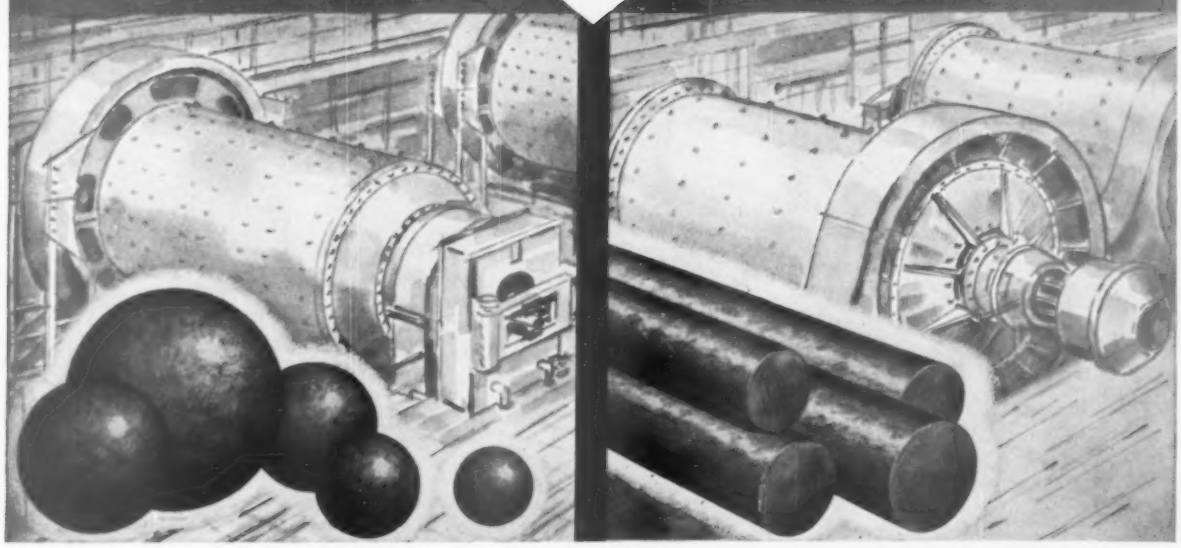
Enter 1077 on Reader Card

Franck VP for Cummins

E. DON TULL, president of Cummins Engine Co., Inc., announced the promotion of R. W. Franck to vice president, sales. Mr. Franck joined the company in 1948. In 1959 he was advanced to his most recent position as director, field sales. The company's main plant is located in Columbus, Ind., with overseas factories in Shotts, Scotland, and San Paulo, Brazil.

(Continued on page 152)

Total grinding costs are lower with CF&I grinding balls and rods



Grinding Balls and Rods have a direct bearing on major grinding costs — mill throughput and power consumption. The use of CF&I Grinding Balls and Rods will actually increase your mill throughput, lowering power consumption per ton of material ground. This is a result of the microstructure of the high quality steel made and used by CF&I.

CF&I Grinding Balls have the balance of hardness and toughness that provides proper wear and impact resistance. In addition, their excellent abrasion resistance permits them to wear evenly and retain their original shape.

CF&I Grinding Rods — through controlled mill chemistry techniques — have excellent wearing properties, resisting bending and premature breakage.

All these factors contribute to more efficient grinding, higher throughput... lower grinding costs. For the complete story on the advantages of CF&I Grinding Balls and Rods, contact your local CF&I sales office.

Other CF&I Steel Products for The Cement Industry

CF&I Industrial Screens • CF&I-Wickwire Rope • CF&I Grader Blades

CF&I Mine Rail and Accessories • CF&I Rock Bolts and Realock Metallic Fabric

CF&I STEEL

MINING PRODUCTS

THE COLORADO FUEL AND IRON CORPORATION

7693-B-REV.

In the West: **THE COLORADO FUEL AND IRON CORPORATION** — Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Leandro • Seattle • Spokane • Wichita
In the East: **WICKWIRE SPENCER STEEL DIVISION** — Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

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ROCK PRODUCTS

One of a series of advertisements prepared by the ASSOCIATED BUSINESS PUBLICATONS

MANUFACTURERS NEWS

(Continued from page 150)

Plumb named sales manager

THE APPOINTMENT OF Robert F. Plumb to the position of assistant sales manager of Iowa Mfg. Co., Cedar Rapids, Iowa, has been announced by Kenneth Lindsay, executive vice president. Mr. Plumb will be closely related with various sales functions dealing with domestic sales for the company's line of aggregate producing, bituminous mixing and paving equipment. Mr. Plumb has 26 years experience and service with the company. He has supervised the design of the Model "G" series asphalt plant and other bituminous equipment including driers and dust collectors.

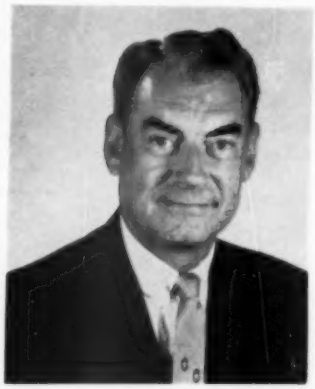
Chrysler to market Perkins diesel engines

CHRYSLER CORP., Marine & Industrial Engine Div., has completed an agreement with F. Perkins Ltd. of Peterborough, England, to market Perkins diesel engines in the United States and Canada, according to an announcement by W. L. Pringle, president of the Chrysler Div. Chrysler will offer the complete line of Perkins high-speed diesels—3, 4, and 6-cylinder units ranging from 25 to 130 hp. All Perkins engines are liquid cooled and operate at speeds up to 4,000 revolutions per minute.

Chain Belt acquires Interest in Argentina

THE ACQUISITION OF an interest in an established chain manufacturing firm, Polimecanica, S. A. in Buenos Aires, Argentina, has been announced by Chain Belt Co., Milwaukee, Wis. Chain Belt holds equal interest in Polimecanica with the Italian Ancarani-Torri interests who are Chain Belt's partners in Rex-Regina S.p.A. of Milan, Italy. The new firm brings to five the number of interests acquired by the company in foreign manufacturing since June of last year. Polimecanica plans to add heavier industrial chains to its lines to serve the needs of the Argentine market and, eventually, markets in other South American countries. John H. Thuerman has been appointed a managing director of Polimecanica.

New VP for Bucyrus-Erie

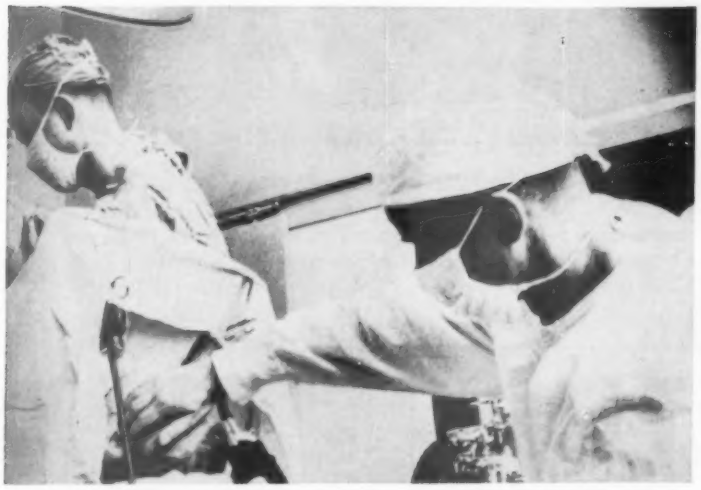


BUCYRUS-ERIE CO., South Milwaukee, Wis., has announced the election of Eugene P. Berg as executive vice president. Mr. Berg has previously been employed as general manager of all Chicago operations of the Link-Belt Co., manufacturer of conveyor equipment, and had been with that firm since 1937. He is a graduate of Purdue University and the University of Chicago.

Dangler pres. of Hercules

THE ELECTION OF Alfred Dangler, Jr., as president of Hercules Galion Products, Inc., Galion, Ohio, was announced by David Van Alstyne, Jr., chairman of the board. Dangler will succeed E. Paul Monroe who is retiring after 53 years of service. Mr. Dangler has been executive vice president and general manager of the corporation since 1952. Hercules Galion Products, Inc., is an outgrowth of the Galion Metallic Vault Co., organized in 1905 and the Ditwiler Mfg. Co., manufacturer of automotive steering gears, both of Galion, Ohio.

END



SPEAKING of OPERATIONS

THE TOOLS FOR YOURS ARE IN THE BOOK

Ready Mixed Concrete

By

James A. Nicholson

Now get the *inside story* on the fastest-growing industry in the world. READY MIXED CONCRETE contains 10 sections and 40 chapters of know-how for organizing a new business or improving an established one. James A. Nicholson, recognized authority in the field, covers every facet of successful operation . . . from maintenance to merchandising . . . from front-office management to labor and customer relations. Send today for this powerhouse of interesting, informative reading.

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R-1160

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Company .....

Street .....

City .....

Zone ..... **State** .....

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You may find just what you're looking for in the used equipment, employment and professional advertisements below. Box numbers are confidential and advertisers' names will not be disclosed. Send replies to: Box Number (shown on ad), c/o ROCK PRODUCTS, 79 W. Monroe St., Chicago 3, Ill. All replies will be forwarded to advertisers daily.

LIQUIDATING

1—Allis Chalmers SS rotary dryer, 6' x 50', complete with drive, motor, fans and blowers.

2—Louisville SS rotary dryers, 8' x 50', complete with drives, motors, fans, blowers, etc.

1—Traylor 11' x 155' rotary kiln, 2 tires, welded ⅞" shell, complete with drive and motor

1—Louisville rotary steam tube dryer, 8' x 45'

1—Rotary dryer 7' x 60', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary 6' x 64', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary dryer 6' x 56', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary dryer 6' x 50', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Rotary dryer 6' x 35', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment

1—Steel ball mill 7½' x 7', complete with full charge of steel balls and drive

1—General American 7' x 40' rotary dryer, ⅜" welded shell, complete

1—Bartlett & Snow Lab. Calciner, 6" x 7'

10—Pacific vertical feed water reciprocating pumps, 10 GPM to 340 GPM, 80' head to 175' head, complete with motors

1—Dorr Type DSFR—2 classifier, 3' x 20'6" x 2½" slope

1—Hardinge pilot size ball mill, 24" x 8", complete

1—Patterson rod mill, 4' x 11'6"

R. GELB & SONS, INC.

U.S. HIGHWAY 22, UNION, N. J., Phone MUrdock 6-4900

FOR SALE

8'x60'x½" welded Rotary Kiln
6'x120'x½" Vulcan Rotary Kiln
4'x30' Bonnot Rotary Dryer
Mosser 4'x47'x5/16" Rotary Dryer
3'x3'x12' Horiz; 4'x9'x12' Vert. Puggers
Komarek-Greaves 27"x24" Briquet Presses
6'x25'; 6'x50' Louisville Rotary Dryers
7'x50'; 8'8"x70' Ruggles-Coles Dryers
Traylor 8'x11' Steel Lined Ball Mill
Allis-Chalmers 7'x24' Mill
Dixie #5060 Mogul Hammermill
Penna. SX13 Hammermills, 400 HP
Heil Patterson Crushers, 100 HP
Raymond 5 Roll #5057 Hi-Side Mill
Raymond #50, #40 Impact Mills
Koppers 36"x42"—2 Roll Crushers
Jaw Crushers 48"x60", 36"x48", 20"x6"
4—Robinson Saw Tooth Crushers
Screens 4'x6'—1 Deck; 5'x8'—3 Deck
535'—24" Troughing Belt Conveyor
10,000 ft. Trough Conveyor 30"; 36"; 42"
Bucket Elevators 45° to 90° Centers
100 Steel Tanks 1000 to 350,000 gal.

BOILERS — COMPRESSORS — GENERATORS — VIBRATORS — TROMMEL SCREENS — WEIGHTOMETERS — BARBER GREENE PORTABLE LOADERS — CAR SHAKERS — SKIP HOISTS — STEEL BIN, etc.

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HEAT & POWER CO. INC.
ROCK PROD. EQPT. DIV.
60 E. 42 St. New York 17, N.Y.
MU 7-5280

UNIVERSAL MOVEABLE JAWS
Unused Government Surplus

Pattern—Part B794-9—2" Pitch
Weight each 764 lbs.
Pettibone-Mulliken Casting
For Universal 18 x 30 Crusher
Width 30"—Length 42"

BUY-EM in Quantity

1 to 10	$89.50 Each
11 to 30	74.50 Each
31 to 50	59.50 Each
51 to 100	49.50 Each

FOB:—Pacific Coast Point

COAST EQUIPMENT COMPANY
444 - 8th St. San Francisco

JAW CRUSHERS
60"x48" to 6"x3"
New and used RELIABLE

"Farrel-Bacon" Jaw Crushers

BACON-PIETSCH CO., INC.
26 Park St., Montclair, N.J.
29 Washington Ave., Hamden, Conn.
Phone Montclair—Pi 6-1300

BRAND NEW BROCKWAY IDLERS
Sacrifice Sale

Precision Bearings, 4" dia. Greaseless, Sealed For Life.

18" $20.00	30" $23.00
24" $21.00	36" $25.00

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4132-7th Ave.
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DEPENDABLE USED MACHINES
1957 Willys 4 wheel drive Jeep truck with Schenecker Backhoe

Amer. car puller	Unit 514 ½ yd. backhoe	Amer. 50B 3 drum hoist w/slewer
5x-4 Telsmith d.d. screen	Unit 614 ½ yd. backhoe	Bay City #25 gasoline dragline
5x16 Telsmith d.d. screen	Adams Tandem Grader 42-C	¾ yd. Lorain TL25K dragline
Austin 8 ton roller KT-142	Bay City ½ yd. #25 hoe	Int. tractor TD-9 w/B-E dozer
P&H 150 ½ yd. dragline	Quickway truck crane Mod. E	Cable controlled D7 angle Dozer

This equipment rebuilt in our modern plant by expert mechanics. Come see it!
Chicago phone HI-lltop 5-6800 TRACTOR & EQUIPMENT CO. 10002 SW Hwy, Oak Lawn, Ill.

Jaw Crushers, Cones, Rolls, Pulverizers, Feeders, Screens, Conveyors, Bins, Dryers, Kilns, Shovels, Trucks, Mine Cars, Rail & Locomotives. We specialize in good used Mine & Quarry equipment.

C. A. CONSTANCE & SONS
Box 2222, Phone AL-33968, Asheville, N. C.

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CONSTRUCTION EQUIPMENT FROM MAMMOTH TRINITY DAM PROJECT

CALIFORNIA

Liquidating $14,000,000.00 worth of well-maintained, top name equipment at **BARGAIN PRICES!**

CONVEYOR SYSTEM

2 miles long, 42" wide rubber belt. 9 flights, available individually, ranging from 672 ft. long to 1885 ft. long. Braking by electric motors acting as generators under belt load; also mechanical brakes. System includes drive-over hopper loading station for scraper discharge, screening and crushing plant, three drive-under terminal bins with total capacity of 1500 cu. yds.

SHOVELS AND CRANES

2—Model 150B Bucyrus Erie 6 cu. yd. Electric Shovels and Draglines (Note: 8 cu. yd. Dippers w/handles available for above); 1—Model 120B Bucyrus Erie 5 cu. yd. Electric Shovel and Dragline; 1—Model 38B Bucyrus Erie 1½ cu. yd. Shovel, Dragline, Backhoe, diesel; 1—Model 22B Bucyrus Erie ¾ cu. yd. Shovel, Dragline, Backhoe, diesel.

MOTOR PATROLS

9—Model 12 Caterpillar Motor Patrols, 8T, 80D, 70, and 71D Series.

HAULING UNITS

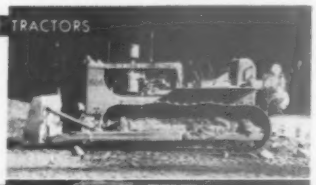
8—Model LRVX Mack Tractors w/Model 137W Euclid 30 cu. yd. Bottom Dump Trailers powered by NVH-12-B1 Cummins Engines; 10—Model PH95AC International Payhauler Tractors w/Model PW20 30 cu. yd. Athey Bottom Dump Trailers.

END DUMP EUCLIDS

5—Model 46TD Euclid End Dump Units, 15 cu. yd., powered by Model NHRBIS Cummins Engines; 10—Model 63TD Euclid End Dump Units, 15 cu. yd., powered by Model 6-110 GMC Engines.

LOADERS

1—Model 175ADS Michigan 3 cu. yd. loader powered by Model 135DKBS Waukesha Engine; 1—Model D4 Caterpillar Loader w/Model EA4 Trackson Loader.



CRAWLER TRACTORS

15—Model D9 Caterpillar Tractors w/P.C.U.'s and Dozers, 18A Series (Note: 4—Ateco Hydraulic Rippers available for above); 21—Model D8 Caterpillar Tractors w/P.C.U.'s and Dozers, 14A Series (Note: 6—Caterpillar #8 Hydraulic Rippers available for above).

RUBBER TIRED TRACTORS

30—Model DW20 Caterpillar Tractors w/Model 456P Modified Scrapers, 67C and 88E Series; 10—Model DW20 Caterpillar Tractors w/Model PW20 Athey Wagons, 88E Series; 2—Model 33LDT Euclid Tractors w/Model 32SH Scrapers.

QUARRY DRILLS

1—Model TWM2A Joy Quarry Drill w/T500 Drills, pneu. tires; 3—Model TWM-5 Joy Quarry Drills w/T500 Drills, pneu. tires.

SPRINKLER TRUCKS

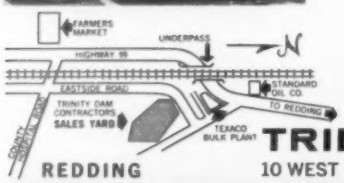
1—3400 gal. Model CF523C6 Kenworth powered by Model NRT6B1 Cummins Engine; 1—3400 gal. Model R1F402 International powered by Model NHB Cummins Engine; 1—3600 gal. Model RDF192A International powered by Model JBS600 Cummins Engine; 2—6000 gal. Model 46TD Euclid powered by Model NHRBIS Cummins Engine.

DUMPCRETE

5—4 yd. Dumpcretes mounted on International truck.

ALSO:

AIR COMPRESSORS • PUMPCRETE MACHINES • BATTERY LOCOMOTIVES • TRUCKS • PICKUPS AND JEEPS • WELDERS • LIGHT PLANTS • HOUSE TRAILERS • PUMPS • AIR TOOLS • ELECTRIC TOOLS • HOSE • PIPE • TANKS AND OTHER EQUIPMENT



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1—Smidth 8'6" x 175' Rotary Kiln ¾" shell.
1—Allis Chalmers 9' x 130' Rotary Kiln ¾" shell.
2—Allis Chalmers 7'6" x 7' x 125' Rotary Kilns.
1—Allis Chalmers 4' x 40' Rotary Kiln ⅜" shell.
1—Traylor 8' x 80' Rotary Dryer ⅝" shell.
1—Vulcan 8' x 80' Rotary Dryer ½" shell.
2—RotoLouvre Dryers 6'4" x 24'.
1—Vulcan 6'5" x 60' Rotary Dryer ⅜" shell.
1—Vulcan 6' x 54' Rotary Dryer ⅝" shell.
1—Rennenburg 6' x 50' Rotary Dryer ⅜" shell.
2—Bonnot 6' x 40' Rotary Dryers ½" shell.
3—Davis 6' x 25' Rotary Dryers ½" shell.
1—Ruggles Cole 5' x 30' Rotary Dryer ⅜" shell.
1—Allis Chalmers 4' x 30' Rotary Dryer ⅜" shell.
1—3' x 36' Rotary Dryer ⅜" shell.
1—34" x 30' Rotary Dryer $\frac{1}{10}$" shell.

MILLS - CRUSHERS - PULVERIZERS

1—Traylor 42" Gyratory Crusher 250 HP motor.
1—Traylor Compeb Mill, 7' x 27', 600 H.P.
2—Hardinge 10' x 48", 8' x 36" Conical Ball Mills, motor driven.
1—Traylor 54" x 24" double roll crusher.
1—Traylor 42" x 18" double roll crusher.
1—Allis Chalmers 36" x 16" double roll crusher.
4—Strategic 30" x 16" double roll crushers.
3—Traylor 30" x 14" double roll crushers.
1—Penn Hammermill, size 5060, Hopper opening 60" x 24".
1—Penn. Super-Thor Hammermill, size SXT-13, 250 H.P.
1—Kennedy Van Saun 4'6" x 9' Ball Mill.

AIR SEPARATORS - SCREENS

1—16' dia. Raymond Whizzer separator with 50 H.P. motor.
1—14' dia. Raymond Whizzer separator with 60 H.P. motor.
1—14' dia. Gayco Whizzer separator with 25 H.P. motor.
1—8' Gayco Whizzer separator with 10 H.P. motor.
1—6' x 14' Link Belt double deck Vibrating Screen.
1—5' x 12' Niagara double deck Vibrating Screen.
1—14' dia. Gayco Whizzer separator with 25 HP motor.

WIRE PHONE WRITE

Your Inquiries Solicited—Send for Circulars

BRILL EQUIPMENT COMPANY

35-57 Jabez Street, Newark 5, N. J.
Tel: Market 3-7420

SHOVELS & DRAGLINES

1—Marion Walking Dragline, 5 yd. Type 7200, Serial No. 88 39, diesel engine driven. 50 H.P. G.E. Motor, 230 V. DC boom hoist with 20 H.P. G.E. Motor, 230 V. 45 KW G.E. DC generator driven by Model NHB5, 6-cylinder Cummins engine.

1—Marion Dragline, 4 yd. Model 111-M Marion Diesel Electric, year 1947. Powered by twin GMC diesel engines. 100 ft. Dragline boom 3½ cu. yd. Essco dragline bucket; 4 yd. Marion shovel front attachment.

1—Bucyrus Erie Shovel, 7 yd. Model 170-B Electric, Serial No. 55335, year 1947. Equipped with standard shovel front, 7 cu. yd. Esco rock dipper bucket. Rotoclone air filter system, size 24. Includes approx. 1000 feet of 5000 volt lead cable.

1—Bucyrus-Erie Dragline, 2½ yd. Model 54B Serial No. 72812. Mounted on crawler with 36" wide pads, equipped with 80' sectional dragline boom. 2 yd. dragline bucket. powered by Buda diesel engine Model No. 6DC187-D3437M.

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Salt Lake City 10, Utah

ELEC. AIR COMPRESSORS
6—Inger Rand, 1350, 2200, 3000 & 3800'

DIESEL ELEC. LOCOMOTIVES & CRANES
4—65 ton Whitcomb 2—25 ton & 2—20 Ton
2—45 ton & 1—80 ton & 4—100 ton Gen. Elec.
25 ton Amer. Diesel Loco Crane

ROTARY DRYERS & KILNS
5' x 25', 6' x 72', 8' x 60', 9' x 160', 10' x 78',
5' x 35' Ruggles-Coles XA-8 Dbl. Shell.
36" x 30' Ruggles Coles Rotary Kiln complete
2', 3', 4', 5½' & 7' Symons Cones

REDUCTION MILLS & FEEDERS
6' x 9' Traylor Ball Mill w/motor
5' x 5' & 6' x 4' CIW Ball Mill w/motor
5' x 10', 6' x 12" & 7' x 15' Rod Mills
2—KVS 5' x 8' Ball Tube Mills Air Swept
4' 0" Traylor Type TY-Gyratory
18" x 30", 24" x 36", 36" x 42" Jaw Crushers.
42" & 36" KVS Primary Breaker Gyratory
25B Telsmith Primary Breaker
2—20" Allis-Chalmers S.McC. Gyratory Crs.
15" x 24" Rogers RB Jaw Crusher
18" x 36" Farrel Bacon Jaw Crusher
15" x 24" & 20" x 36" Pioneer Jaw Crushers
2A Cedar Rapids Port. 24 x 16 Roll Crusher
14x28, 15x24 & 10x36 Cedar Rapids Jaw
48" x 60" & 48" x 72" Jaw Crushers
Bradley Hercules Mills (3) Type 6000
F55 Syntron Grizzley Feeder
3' x 12' Seco Single Screen
8' Gayco Centrifugal Air Separator
36" x 96" H.R. Vibrating Pan Feeder New
24" x 95' H.R. Truss Conveyor New
6—30" x 32" Ding's Magnetic Head Pulleys
3—200 HP & 160 HPSD. Ottumwa Elec. Hoists.

ELEC. WHIRLEY CRANES
2 Amer. R20-60 Ganty 139' Boom

WANT KILNS—DRYERS—CRUSHERS

R. C. STANHOPE, INC.
60 E. 42nd St., N.Y. 17, N.Y.
TEL. MU 2-3076 & 2-1898

LOCOMOTIVE: EMD General Motors 1200 H.P. Switcher.

KOEHRING DUMPTOR: Model 60, used only 10 hours.

CRUSHERS, JAW: One 40 x 42" Allis Chalmers with 150 H.P., V-belt drive motor and controls, with or without heavy duty Apron Feeder 42" x 14'3" with motor, reducer and drive, condition guaranteed. One Allis Chalmers 24 x 36" and one 18 x 30". One Traylor 15 x 24". Other Crushers 8 x 10" to 48 x 60".

CRUSHERS, GYRATORY: 48" Primary and 20" Secondary, with motors and drive. 1 Telsmith 16-B.

CRUSHERS, REDUCTION: Two Symons 3 ft., one short head, one standard with motors.

CRUSHER, ROLL: Traylor 16 x 36".

FEEDERS: Four Jeffrey 24" x 48", model 4-DTS. One Telsmith 42" x 14 ft. with reducer, motor and drive.

DRYERS: One 5' x 25 ft., one 3' x 34 ft.

KILN: Rotary 4½ ft. dia. x 40 ft. with rotoclone and 7½ H.P. motor, 3 H.P. motor and speed reducer, classifier, kiln burner, etc.

TUBE MILL: One Allis Chalmers 5' x 22 ft. with motor and drive.

DOUBLE DRUM HOISTS: One 53" x 36" dbl. clutched drums, 75 or 200 H.P. One 72" dia., 40" face, both drums clutched, 1¼" rope, 880 FPM, 500 H.P. One Nordberg double clutched drums, 10' dia., 10' face, 1½" rope, 1250 H.P., 1200 FPM.

SINGLE DRUM HOIST: One 84" dia., 64" face, 1⅝" rope, 150 H.P. Two 86" dia. roller bearing sheaves.

All the above hoists with post brakes, Lilly controls, 2200 volt motors. Other hoists 100 to 1500 H.P., shaft or slope.

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Lansdowne Theatre Building
LANSDOWNE, PA.
Phila. Phones: MAdison 3-8300—3-8301

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DRAGLINES, SHOVELS, CRANES
DRILLS, TRUCKS

15-W B.E. Elec. Drag, 215', 12 yd.
450-W B.E. Diesel Drag, 165' w/extra 10, 12, 13 & 14 yd. buckets.
9-W B.E. Elec. Drag, 165', 10 yd.
9-W B.E. Diesel Drag, 165', 12 yd.
7-W B.E. Diesel Drag, 140', 7 yd.
7400 Marion Diesel Drag, 175', 13 yd.
71-B B.E. Crane with 160' boom
625 Page Diesel Drag, 150', 10 yd.
1855 P&H Diesel Drag, 130', 10 yd.
621-S Page Diesel Drag, 125', 7 yd.
200-W B.E. Diesel Drag, 125', 8 yd.
2400 Lima Elec. Drag, 130', 6 yd.
2400 Lima Diesel Drag, 130', 6 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B B.E. Elec. Drag, 115', 5 yd.
111-M Marion Drag, 100', 4 yd.
1055 P&H Diesel Drag, 80', 4 yd.
1601 Lima 4 yd. Shovel/Drag
3900, 3500 & 3000 Manitowoc Cranes
5560 Marion 26 yd. Elec. Shovel
5323 Marion 18 yd. Elec. Shovel
190-B B.E. 8 yd. Elec. Shovel
151-M Marion 7 yd. Elec. Shovel
1600 P&H 6 yd. Elec. Shovels
170-B B.E. 6 yd. Elec. Shovel
4161 Marion 6 yd. Elec. Shovel
2400 Lima 6 yd. Std. & H.L. Shovels
120-B B.E. & 4121 Marion 4 yd. Elec. Shovels
4500 Manitowoc 5 yd. H.L. Shovel
1055 P&H 3 yd. H.L. Shovel
1201 Lima 3½ yd. Standard Shovel
111-M Marion Standard & H.L. Shovels
3500 Manitowoc Standard & H.L. Shovels
54-B B.E. Standard & H.L. Shovels
Model T-650 REICHdrill Truck Mtd. Rotary & Down-The-Hole
Ingersoll-Rand Truck Mtd. & Crawler Mtd. Drillmasters
Keystone ±50 Truck Mtd. Stardrill
McCarthy & Compton Coal Auger Drills
Euclid Trucks, Dozers, Attachments, etc.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton National Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

(New)
GENUINE INGERSOL RAND
ROCK BITS—*save up to 80%*

Types 182 Thread.
Side Hole & Center Hole.
Sizes 1½", 1⅝, 1¾, 1⅞, 2, 2⅛, 2¼, 2⅜, 2½.
Lots of 50 or more 20¢ each up to 2"
Lots of 50 or more 25¢ each up to 2½"
Additional discount 10% on 500 or more, 20% on 1000 or more.
Exceptional value. Stock up now while supply lasts.
WENZEL MACHY. CO. 565 S. 10th
Kansas City, Kans. Mayfair 11710

KEEP ABREAST
WITH
INDUSTRY TRENDS
THROUGH
ROCK PRODUCTS

FOR SALE

Good Used Conveyor Belting
All Sizes—All Plys

Special Sale
36" 42" 48" 50" 52" 56"

Phone or Write

EUGENE L. ASHMUS
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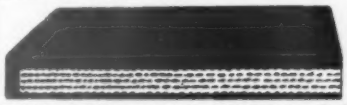
Kenosha, Wisconsin
OL. 2-4596

BONDED BARGAINS

TESTED CONVEYOR BELTING

WE PAY FREIGHT ON 200 POUNDS OR OVER PLUS AN ADDITIONAL 10% SAVINGS FROM SALE PRICE FOR FULL ROLLS 500 TO 650 FEET.

All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.



MAJOR BRAND: 12# to 15# Friction Pull. 800# to 1000# Cover Tensile. Heavy Duty. 28 os. duck. 1/8" top x 1/16" bottom rubber covers. Tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, salt, earth and similar materials.

Width	Ply	U. S. Made Per Foot
14"	4	$2.94
16"	4	3.09
18"	4	3.42
20"	4	3.95
24"	4	4.43
30"	4	5.42
36"	4	6.43

MAJOR C-BEE BRAND: Smooth Surface. 15# to 17# Friction Pull. 1600# to 2300# Cover Tensile. 28 os. duck 4 Ply. Skim coat between plies. Heavy Duty belt for severe service and abrasion resistance.

Width	Top Cover	Bottom Cover	Imported Belt Per Foot
14"	1/8"	1/16"	$2.96
16"	1/8"	1/16"	3.12
18"	1/8"	1/16"	3.44
20"	1/8"	1/16"	3.97
24"	1/8"	1/16"	4.46
30"	1/8"	1/16"	5.56
36"	1/8"	1/16"	6.45
THE FOLLOWING BELTS ARE 5 PLY, 32 OZ. DUCK:			
24"	1/8"	1/16"	$4.53
30"	1/8"	1/16"	5.60
36"	1/8"	1/16"	7.18

MAJOR BEE BRAND: 16# to 19# Friction Pull. 2400# to 3000# Cover Tensile. Skim Coat Between Plies. A high grade of heavy duty, 28 os. duck with 1/8" top x 1/16" bottom rubber covers. For severe service and abrasion resistance. For stone, mineral ores, concrete, cement and coal.

Width	Ply	U. S. Made Per Foot	Imported Belt Per Foot
16"	4	$3.68	$3.14
18"	4	3.98	3.47
20"	4	4.54	3.99
24"	4	5.14	4.50
30"	4	6.31	5.58
24"	5	6.01	5.25

Other widths, plies, duck weights and cover thickness available at low prices.

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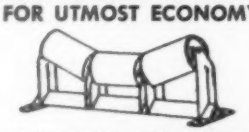
BONDED® IDLERS & RETURN ROLLS FOR UTMOST ECONOMY



3-roll, 5" diameter Troughing Idlers for:

14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:

14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable pre-lubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

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10' x 78' National dryers, 3/4"
8'-8" x 70' Hardinge, 5/8" welded
8' x 60' rotary kiln, 1/2" welded
8' x 60' Davenport, 7/16" welded
7'-6" x 62' kiln, 1/2" welded
7' x 70' Louisville, 1/2" welded
7' x 60' Bonnet dryer, 5/8"
7' x 50' Allis-Chalmers, 5/8"
6' x 7' x 100' kiln, 1/2" shell
6' x 52' Bonnet dryer, 7/16"
6' x 50' Louisville steam-tube
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4'-9" x 32' dryers, 3/8" shell
3' x 23' Standard dryer, 1/4"

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Vulcan 10' x 11' x 175' long rotary kiln, 13/16" shell, 2-tires, firing hood, etc.

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Hardinge 4'-6" x 16" conical ball
Allis-Chalmers 6' x 18' pebble-tube
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Symons 2' shorthead cone crusher
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Buchanan 24" x 13" jaw, 50 HP
Farrel 20" x 6" jaw, 30 HP
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Sturtevant 8" x 10" jaw
Babcock & Wilcox #32E ball type pulv., air-swept, 75 HP
Raymond 66" 6-roller mill, 200 HP
Raymond 50", 5-roller, hi-side mill
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Amer. #38-S rolling ring crusher
Wms. 36 x 24 hammermill, 50 HP
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Elevators, 95' high, 14" x 7" steel buckets, chain, casing, 7½ HP TEFC drive
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Conveyor, 18" x 50' drag conveyor, 2 HP drive
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Insley K-12, ½-yd. gas backhoe
Bucyrus-Erie 10B, ⅜-yd. Gas Shovel.
Lorain MC-530W, 35-ton Moto-Crane.
Byers 83-cc, 20-ton truck Crane
Lorain MC-414, 20-ton Moto-Crane.
Link Belt HC-90, 25-ton truck crane.
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3—Allis Chalmers TS-360, 15-yd. scrapers.
1—Euclid TS-24, 24-yd. twin engine scraper.
1—Euclid 15½-yd. six wheel scraper.
5—Euclid 7-yd. overhung engine scrapers.
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CONE: Symons 3', 4¼', 5½', Kue-Ken 36"; Traylor TY4; Telsmith 3'.
ROLL: Cedar Rapids 34x16, 55x30; Al. Chal. 27x16, 42x16. Pioneer 40x22, 40x24 triple, 54x34; Telsmith 40x22; Universal 30x18; Lippman 49x30.
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Whitcomb	80-ton
GE	70-ton
Whitcomb	44-ton

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PRICED TO SELL

4 COLBY model 200, 45 ton, High Gantry WHIRLEY CRANES
25 ton IND. B.H. Diesel Loco. Crane
AIR COMPRESSORS. 1909 CFM, 100 PSI. 26"x16"x18", Worthington type DC-2, Syn. 350 H.P., 2300 v.

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Price $5000.
Write for details.
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Limestone Deposit For Lease

40,000,000 tons strippable Vanport Limestone. Dock Site and loading facilities on Allegheny River 3 miles from stone deposit. Also 2 railroad connections and on main highway. Ideal proposition for flux, cement or highway road materials.

Write Box S-59, Rock Products,
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Chicago 3, Illinois

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Rotary Kilns, Dryers & Coolers
Ball, Rod & Tube Mills
Roll, Cone, Jaw & Gyratory Crushers
Compressors, Locomotives, Derricks & Cranes
Screens, Separators, Classifiers, Cars

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WANTED

Used 36-45 Cedar Rapids Double Impeller Impact Breaker. State condition, location and price. Box S-64, Rock Products, 79 W. Monroe, Chicago 3, Ill.

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With at least 4 yard dragline, Dozer, Loading Shovel and Rock Hauling Equipment to contract stripping & hauling limestone to plant. Located in Central Ohio. Good opportunity for right party. Box no. S-61, c/o Rock Products, 79 W. Monroe, Chicago 3, Ill.

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MACHINERY ONLY

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A leading western producer of Portland cement has an opening for a qualified plant chemist.

This position involves complete responsibility for the physical, chemical and process control program at a modern plant in a progressive, expanding company.

A B.S. in chemistry plus five or more years experience in the production and control of Portland cement is required.

The salary will be commensurate with training and experience.

Box S-65, Rock Products
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Fast-growing Company needs able men in various areas to promote and sell complete line of wear-resistant steel castings, screens, and a new improved Crusher for Aggregate Plants and similar customers. Must be free for unlimited travel. Reasonable starting salary, car provided and expenses paid. Unlimited opportunity. Give full details of your age, education, experience, present earnings, etc., in first letter. Completely confidential. Personal interview arranged with qualified applicants. Box S-66, ROCK PRODUCTS Magazine, 79 West Monroe Street, Chicago 3, Illinois.

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Crushed stone quarry in Chicago area. Write, giving complete details of experience, education and salaries earned. Confidential. Box S-62, Rock Products, 79 West Monroe St., Chicago 3, Ill.

GYPSUM BOARD PLANT SUPERINTENDENT

Outstanding opportunity. Gypsum experience necessary. College education in engineering preferred. Rocky Mountain location with a leading western building materials manufacturer. Reply in confidence with complete details to: Box S-63; Rock Products, 79 W. Monroe, Chicago 3, Ill.

Chief Chemist with more than 35 years of experience in the manufacture of all types of Portland Cement including Oil Well seeks connections with reliable cement company preferably in Latin America where he has been working for some time. He has an excellent record and is well respected by the industry. He is willing to go elsewhere if inducements such as salary, living conditions, school and medical facilities are good. He is married, four children and is in excellent health. Salary commensurate with his ability and vast experience.

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PRODUCER PURCHASING SERVICE — *FREE*

QUICK—COMPLETE SOURCE CONTACTS FOR ROCK PRODUCTS PRODUCERS on Machinery—Equipment—Supplies—Service

___Aftercoolers, Air
___Agitators
___Aggregates (special)
___Air Compressors
___Asphalt Mixing Plants
___Bagging Machines
___Bags
___Barges
___Belting, Conveyor
___Elevator, Power Transmission
___Belting, V-type
___Belt Repair Equipment
___Bin Level Indicators
___Bins and Batching Equipment
___Bits
___Blasting Supplies
___Bodies, Trailer
___Buckets
___Bulldozers
___Cars, Industrial
___Classifiers
___Clutches
___Coal Pulverizing Equipment
___Concentrating Tables
___Conveyors
___Crushers
___Coolers
___Cranes
___Derricks
___Dewatering Equipment, Sand
___Diesel Engines
___Dragline Cableway Excavators
___Draglines
___Dredge Pumps
___Drilling Accessories
___Drills
___Dryers
___Dump Bodies
___Dust Collecting Equipment & Supplies
___Electric Motors
___Engineering Service Consulting and Designing
___Explosives & Dynamite
___Fans and Blowers
___Feeders
___Fifth Wheel Heavy Duty Special
___Flotation Equipment
___Front End Loaders
___Gasoline Engines
___Gear Reducers
___Generator Sets
___Grinding Media
___Gypsum Plant Machinery
___Hard Surfacing Materials
___Hoists
___Hoppers
___Kilns: Rotary, Shaft, Vertical
___Locomotives
___Lubricants
___Magnetic Separators
___Mills
___Pipe
___Pumps
___Scales
___Screen Cloth
___Screens
___Scrubbers: Crushed Stone, Gravel
___Shovels, Power
___Speed Reducers
___Tanks, Storage
___Tires and Tubes
___Torque Converters
___Tractor Shovels
___Tractors
___Trailer Dump Bodies
___Trucks, Bulk Cement
___Trucks, Industrial
___Trucks, Mixer Body
___Trucks, Motor
___Valves
___Vibrators
___Welding and Cutting Equipment
___Winches
___Wire Cloth
___Wire Rope

If equipment you are in market for is not listed above, write it in space below.

_____

_____

The principal rock product(s) manufactured by my company is/are indicated "1", "2", "3", in order of importance below.

___Crushed Stone
___Sand & Gravel
___Slag
___Cement
___Lime
___Gypsum
___Ready Mix Concrete
___Concrete Products Type_____
Other nonmetallic mineral (What?)_____

All above information is strictly confidential to be used to guide the manufacturers in supplying proper information.

Please Check Service Desired

☐ Have Salesman Call ☐ Literature only
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NOTE: See—Where to Buy-Classified Advertising Section for used equipment and complete plant information

Name _____
Title _____
Firm _____
Street & No. _____
City and State _____
Your Signature _____ Title_____

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FOR
NEW CEMENT PLANT

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Salary plus stock option.

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Cement Plants
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CONSULTING ENGINEERS,
SPECIALISTS IN LIME & GYPSUM DESIGN AND OPERATING PROBLEMS
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ROCK PRODUCTS, "Where to Buy" Department
79 West Monroe St., Chicago 3, Illinois

Company _____

Street _____

City _____ Zone____ State_____

Your Name _____

Check One: ☐ Remittance enclosed ☐ Please invoice me

Specify date of insertion:*

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Special report from Rogers Construction Company

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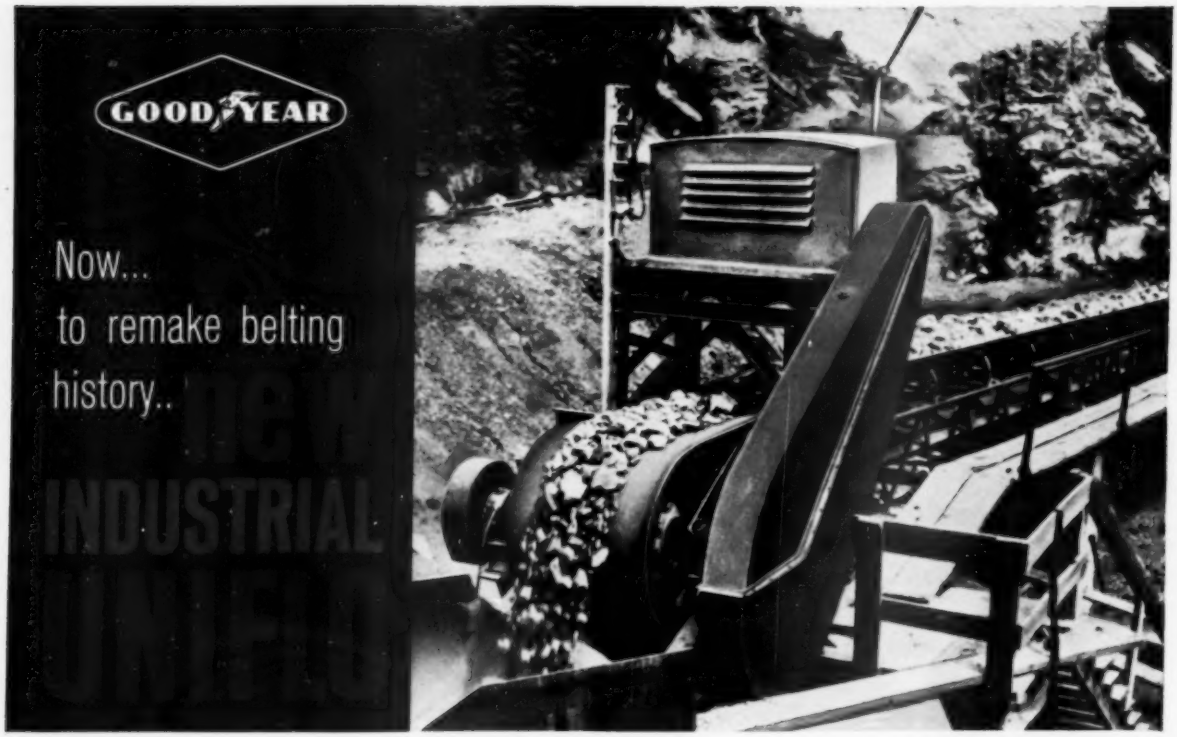

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. . . **proved** its unusually fine cover adhesion and cut-resistance

. . . **proved** its outstanding troughability and trainability

. . . **proved** its exceptional edgewear resistance

. . . **proved** its top-rank fastener-retention—handling wet or dry materials

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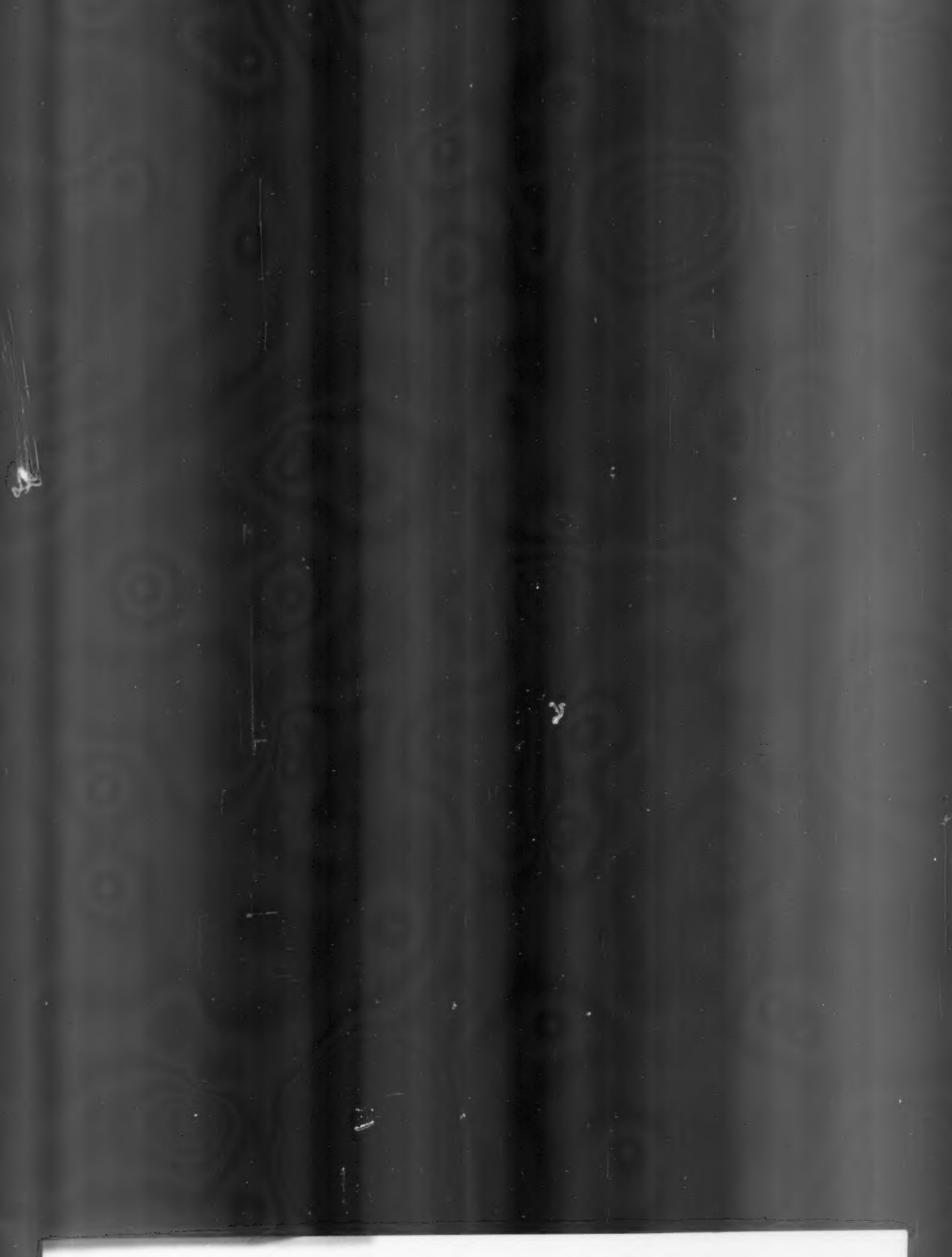
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